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YEARS AGO, BUSINESS PHONE systems were much simpler. Private branch exchanges, or PBXes, ruled. Then along came the Internet, mobile phones, huge data networks, and other technological improvements.

It's that evolution and need to innovate in the PBX market that served as the basis for 3CX, which was founded in 2005 by software entrepreneur Nick Galea, now the company's CEO.

Industry Experience

Galea's experience with PBX deployments gave him first-hand knowledge into how difficult it was for businesses to find a PBX that was affordable and easy to use and manage, while still meeting communications needs.

The emerging SIP standard made it possible to move the PBX platform to a mainstream operating system such as Windows and based on open standards, Galea says. That knowledge that the PBX market would soon be software-based, eliminating proprietary PBX and appliance PBX, spurred the formation of 3CX.

"When the company was first founded, all we had was a vision and a couple of developers. But

we all knew what had to be done to get to where we were meant to be," Galea says.

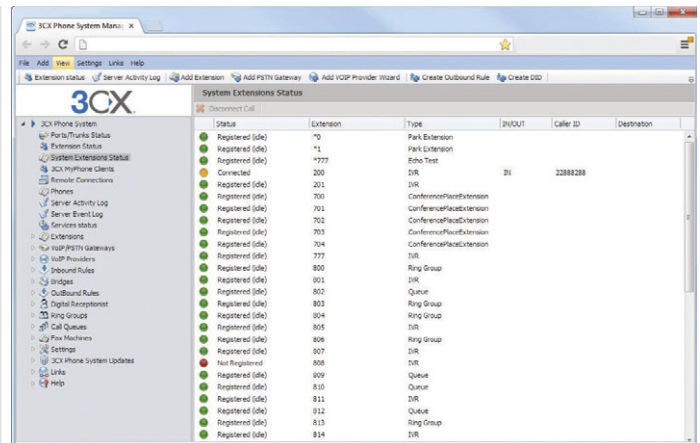
"Not much has changed in that aspect, apart from the fact that we are no longer just a couple of developers." 3CX now has more than 30,000 customers and 70 staff members with offices around the world, including the United States, the UK, France, Germany, and Cyprus.

Galea says the culture of innovation nurtured at 3CX sets it apart. "3CX innovates communications for companies, and we are a technology leader in many areas such as mobility, productivity, and ease of deployment."

Use Existing Hardware

3CX Phone System for Windows, now in version 12, "has brought software PBXes to a brand new level," Galea says.

3CX Phone System (pictured) is Windows-based, so companies can utilize existing hardware with no need to invest in training on new hardware. The newest version offers users increased mobility and productivity, and the 3CXPhone for Android and iPhone clients let users take their extensions with them wherever they go, Galea says.



3CX Phone System for Windows can replace a proprietary PBX; Web-based administration makes management easy.


The system comes in several editions: 3CX Phone System Pro is for businesses that deal with many calls; the Hotel Module; the CRM Integration Module; the 3CX Voice Application Designer; and the newest version, 3CX Cloud Server. There's also a soon-to-be-launched Web conferencing solution.

All 3CX products are sold through partner resellers, which 3CX supports through free training, free technical support, and easy pricing and purchasing procedures.

Focus On Customers

Galea says 3CX's focus on partners and the everyday needs

of their customers has helped 3CX develop an easy-to-use, affordable, feature-packed unified communications solution.

"In a nutshell, the 3CX team focuses on the customer, whether a partner or an end user, and makes sure that their needs are met. This allows resellers to feel confident that they are selling customers modern and competitive PBX software and ensures happy customers." 

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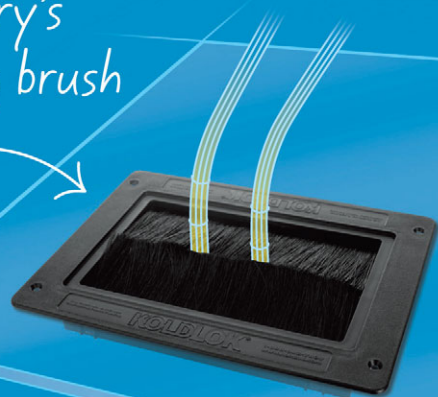
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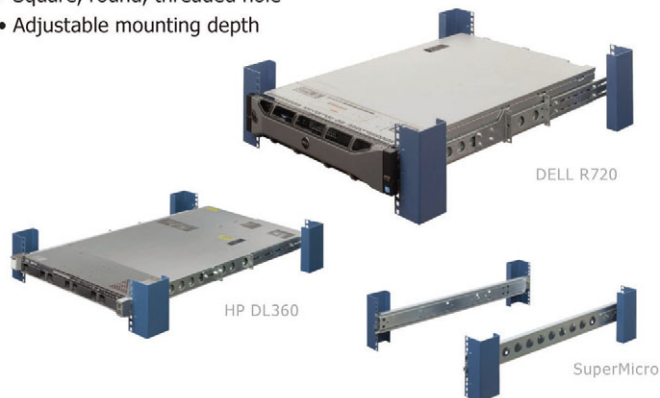


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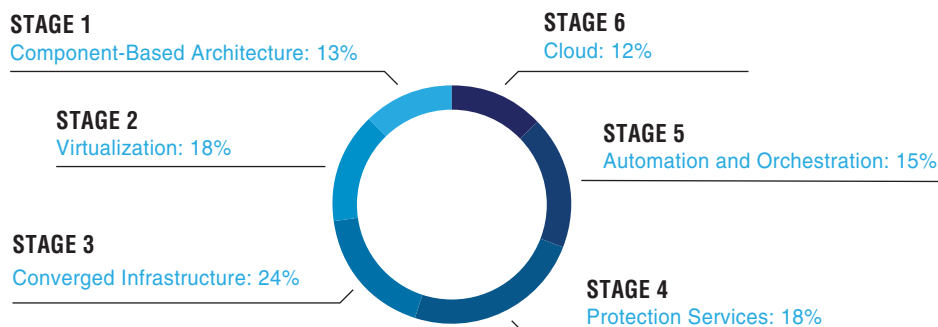
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Study Reveals Progression Of IT Transformation In Organizations

According to a recent Ponemon Institute study of IT practitioners, there are six key stages that best represent the status of an organization's IT transformation. Study results show that the largest group of respondents (24%) indicate their organizations are operating in the third stage known as Converged Infrastructure, which describes a platform that allows an organization "to lower management costs and speed implementation and deployment of new services." IT transformation progression stages include Component-Based Architecture (Stage 1); Virtualization (Stage 2); Protection Services (Stage 4); Automation and Orchestration (Stage 5); and Cloud (Stage 6).

The following chart represents the progressive stages of surveyed IT organizations:

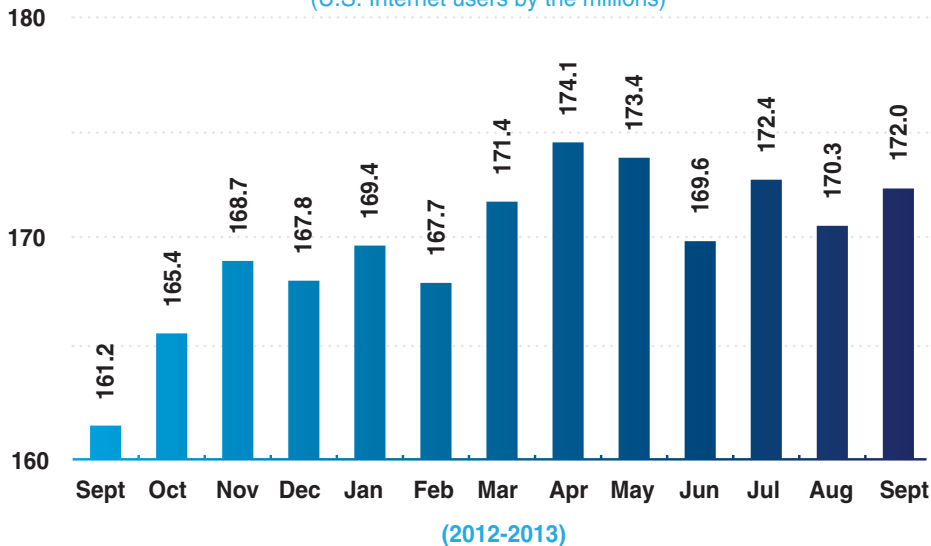


Financial Investors Use Digital Outlets, Still Prefer Desktops Over Mobile

Internet users are continually going back to the Web to access content related to business and finance. Between September 2012 and 2013, more than three quarters of all Internet users (172 billion) looked up business- or finance-related content, according to comScore. Users are also opting to access this content on desktops, as opposed to mobile devices. In fact, comScore research from August of last year indicates that 61% of online traffic came from desktop users. Even so, those who manage and make financial investments are becoming increasingly more comfortable doing so on a tablet or smartphone.

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Software: The Important Brand Asset In The Next Decade

Company success in the next 10 years will depend largely upon reinvention to serve "increasingly powerful customers," according to a Forrester report for CIO professionals. Customers will primarily expect to interact with brands via software in the future, because of the way mobile, big data, the Internet of Things, and digitization have altered user experience expectations. "In the age of the customer, all companies will be software companies. Your most important assets will not be financial assets, they will be software assets," says George Colony, Forrester CEO. "Software will allow brands to become customer-obsessed: to know what their customers want—and how, when, and where they can meet (and exceed) that expectation."

Demand For CDOs To Increase In The Next Year

As data multiplies and diversifies, global organizations will need to appoint leaders to manage information on a large scale. By 2015, Gartner projects that a quarter of global organizations will employ chief data officers. Gartner Fellow and Research Vice President Debra Logan says that the CDO position is common within government, media, and heavily regulated markets. She compares CDOs to CFOs: In the same way a CFO owns minimal processes but oversees exchange of capital, a CDO "owns a few things, but coordinates the use of data in other places." Currently 65% of CDOs work in the United States and 20% are in the U.K.

Overall IT Spending Slows; Niche Markets See Increase

IDC expects its forecast for worldwide IT spending growth to decrease from 5% to 4.6% this year due to currency devaluation and inflation in emerging economies, including Asia Pacific, Central and Eastern Europe, the Middle East, and Africa. The slowdown in the mobile device market after several years of rapid growth is also contributing to the stagnation. However, the United States and Western Europe will see an uptick in spending on servers and storage. IDC also projects that the IT services market will see a growth of 4%.

and infrastructure” related to cloud architecture will triple 2011 spending, IHS reports. Cloud expenditures will account for \$174.2 billion globally this year—this is a 20% increase from last year’s \$145.2 billion in spending. Jagdish Rebello, Ph.D., senior director and principal analyst at IHS, says “spending for cloud-related storage, servers, applications, and content will be dedicated toward building a framework that is rapidly scalable, highly dynamic, available on-demand, and requiring minimal management.” This growth will occur as organizations transition to cloud and rely on data analytics to better understand consumer behavior, Rebello says.

“were expected to enable a new entry-level pricing point for the PC market.” There are positive signs, though, as PC vendors replenish their inventories and customers upgrade as Windows XP nears end-of-life.



2014 IT Job Growth Already At Standstill

The outlook for IT hiring this year isn’t encouraging, based on the IT workforce analysis released by Janco Associates. In January the IT industry experienced a net loss of 1,400 jobs, even though the economy added 113,000 jobs in the same month. Looking back at 2013, the IT job market added 74,000 jobs overall; however, there was a loss of 5,000 jobs in September while November saw practically no new hires. The Janco survey revealed that data processing, hosting, and related services; other information services; and computer systems design-related services all saw a small net increase, though telecommunications jobs experienced a net decline of 14.8%.

Investments In The Cloud Will Multiply Threefold Over Six Years

By the year 2017, enterprise spending on “information technology services, application,

Surprise Growth Seen In Phablet Market

What, you might ask, is a phablet? More recognizable by sight than by name, phablets are mobile devices that exist, size-wise, in the space between smartphones and tablet computers. After meeting lackluster response for a couple of years, it now appears that phablets are finding their niche, somewhat in the Americas and Europe but mainly with consumers in East Asia, according to Juniper Research. The research firm suggests that phablets could see major growth in the coming years and anticipates that more than 120 million units will ship by 2018, up from an estimated 20 million shipped in 2013.

IHS: Global Mobile PC Market Underperforms, Despite Growth

Smartphones and tablets continue to take their toll on the mobile PC market, which includes notebooks and PC tablets, according to the most recent report from IHS. Despite the fact that mobile PC shipments were up 9.4% between the third and fourth quarters of last year, IHS reports, worldwide shipments of 52.6 million units were far less than the 55.3 million units analysts had expected. “Things were looking positive for the fourth quarter of 2013 after the third had come in on target,” says Craig Stice, director for compute, servers, and storage at IHS. Stice says the introduction of new platforms and processors

Businesses Turning To Biometrics

As is often illustrated by the lists of users’ horrendous password choices made public following data breaches, for whatever reason a scary percentage of people fail to use good, strong passwords. Because this laxity can be true in the workplace as well, businesses are increasingly turning to biometric solutions to ensure the security of company-issued devices. According to Gartner, 30% of organizations will require biometric authentication on their mobile devices by 2016. As for using passwords, the research firm recommends using at least six alphanumeric characters and no real words.

Companies, Social Media & Customer Response Times

Although Twitter lags far behind Facebook in terms of total users, Twitter is growing much faster, according to Sprout Social. In its latest “Sprout Social Index,” the company reports that the number of monthly active Facebook users increased 17% between Q3 2012 and Q3 2013 compared to 44% for Twitter. Of greater significance for companies is the fact that user engagement is growing nine times faster than the combined monthly active user increase, and many organizations are finding it difficult to keep up. According to Sprout Social, response times have suffered. At 14.5 hours average response time, government agencies take the longest to reply to user posts that harbor some expectation of a reply; business services are taking the shortest time to reply at 9.5 hours on average.

Re-examine The Case For Deploying DCIM

Determine If The Time Is Right To Embrace Data Center Infrastructure Management's Potential

REPORTEDLY, 36% of those attending a Gartner Research-sponsored conference recently indicated they will probably implement DCIM tools this year in a “significant” way. Another 25% will reportedly do the same within two years. Gartner’s researchers, meanwhile, predict 60% of larger North American data centers will embrace DCIM by 2017.

This type of enthusiasm for DCIM isn’t new. DCIM has been generating a buzz for years because of its potential to help better manage all assets in a single-pane approach, reduce energy use and costs, and determine the best location to install equipment. So why have relatively few small to midsized enterprises (SMEs) formally committed to DCIM?

State Of Affairs

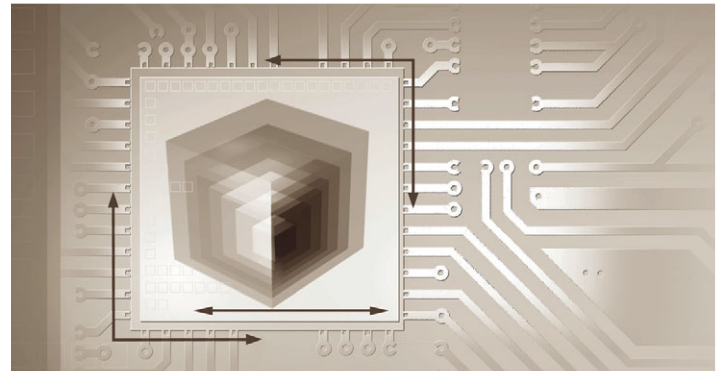
Adoption of DCIM tools among SMEs is expected to grow in the future. For now,

however, adoption is viewed as being low.

Jennifer Koppy, IDC research manager, says that’s mainly because the problems they’re trying to solve with DCIM don’t really align with the cost structures of many of the enterprise-class DCIM solutions. Some DCIM providers, however, are offering as-a-service solutions, and more are expected to do so this year, which will increase adoption rates, Koppy says.

Clive Longbottom, Quocirca co-founder and service director, agrees adoption rates are low but growing, and adds that enterprises that own their own data center facilities are slowly realizing they can’t view the facility and IT equipment separately but rather as one, dynamic entity.

Vendor-wise, Longbottom says rather than push true DCIM solutions, some vendors have created business infrastructure/information



management (BIM) solutions with a “small bit of IT capability.” Most vendors, though, have pushed hard to bridge the chasm between facilities management and IT systems management camps.

Overall, for anyone who owns a data center, Longbottom says, the need for a DCIM solution “is now clear and becoming clearer,” even for organizations that share a facility (colocation)—a reality most SMEs are moving to in the near- to mid-term, Longbottom says.

Making Sense Of DCIM

One natural question concerning DCIM is if the hype is justified. Yes and no, experts say. Roopashree Honnachari, Frost & Sullivan program manager, says the DCIM tools now available are good, but not enough vendor “handholding or consulting services” are available to help with implementation.

Koppy says DCIM’s promise is obtainable if an organization can enact significant

process changes and commit the larger enterprise to the project. Many IT teams have difficulty getting DCIM up and running, she says. DCIM providers that can provide consultation services will be the providers likely to “have happier customers who realize greater ROI,” Koppy adds.

Benefits often attached to DCIM include the greater visibility tools provide into the entire IT landscape. Others

Key Points

- Adoption of DCIM tools among small to midsized enterprises is currently low but expected to increase in coming years.
- Expense, deployment difficulties, and lack of general DCIM knowledge are often-cited adoption roadblocks.
- A successful DCIM implementation can hinge on IT and facilities teams being closely aligned.

Get Started

Deploying DCIM can prove challenging if a siloed nature exists among teams managing different systems. What’s needed is a unified team that combines IT, facilities, and operations expertise, says Roopashree Honnachari, program manager at Frost & Sullivan. A unified team will facilitate interaction among key stakeholders and help explain interdependencies and relationships among various components, which assists with designing, implementing, and managing “a solution better aligned with business goals,” Honnachari says.

include quickly and effectively finding root causes of problems and resolving them; better asset and life cycle management of equipment; creating what-if scenarios for new IT equipment installations; and better energy management.

Koppy says IDC research shows SMEs typically seek out DCIM for operational benefits such as lower energy usage. Larger organizations typically desire more strategic benefits such as linking IT spending with business value.

Overall, DCIM tools automate monitoring of data center infrastructure components, both facilities and IT, Honnachari says, thus enabling better management of costs, achieving efficiencies, and ultimately analyzing data and making changes accordingly.

Reach Your Potential

Beyond being too expensive and difficult to deploy, SMEs report they haven't adopted DCIM yet because they're using other methods to manage data centers. They also lack knowledge concerning available DCIM tools. SMEs with this knowledge that haven't adopted DCIM state the main reason is a lack of "touch points" between facilities and IT, Longbottom says.


SMEs that do have a facilities-IT union may not adopt DCIM simply because of perceived complexities and costs, Longbottom says. Honnachari

says deciding if DCIM tools should come out of IT or facilities' budget can also pose a hurdle to adoption.

Enterprises that do purchase DCIM tools may wind up underutilizing them by implementing and managing them in a siloed manner (facilities and IT), Honnachari says. IT, for example, can ramp up its server and storage environment anytime, but it still depends on facilities to ramp up facilities infrastructure (space, power, and cooling), she says. "Despite the high level of inter-dependency, IT and facilities teams continue to operate separately, which hampers the path to efficiency."

Organizations feeling pressured to provide better, faster, and more reliable IT services without additional budget have to better use what they already have, Koppy says. Doing so "can mean the difference between barely surviving or thriving in the next few years."

There are numerous ways to quantify DCIM's value, Koppy says, including varying ways based on how a company wants to proceed.

In some cases, though, "it's just not an option to continue to run a data center without visibility into how it all connects together," she says. "The regulatory requirements, audits, and security measures make this very painful and expensive, and this will only escalate in the coming years." 

Action Plan

Aim for quick wins. For example, if you're acquiring a DCIM solution, consider initially using asset-discovery and managements tools, mapping tools, and implementing life cycle management.

Use what-ifs. Using the "what-if" capabilities that DCIM solutions provide can enable IT to visualize how a certain scenario will likely play out, such as how installing a new rack in a specific location will impact cooling.

Obtain. Using DCIM tools can help obtain the optimal positioning for existing equipment in terms of power, cooling, and other factors.

Combine. Combine DCIM tools you acquire with existing management tools to optimize the entire enterprise environment on an ongoing basis.

Top Tips

Maximize every resource. To ensure that DCIM tools are used to their fullest, it helps greatly if IT and facilities teams are closely aligned. Reduced infrastructure costs, more operational efficiency, and alignment of IT with business goals are potential benefits of doing so.

Get both IT and facilities onboard. Having IT and facilities teams that aren't in close alignment can lead to DCIM tools getting used differently, depending on which team bought the solution.

Ask around. When eying DCIM vendors, ask their current customers questions pertaining to your concerns. Also ensure that the vendor possesses a good road map of where it sees DCIM going in the near and distant future.

The Future Of Flooring

Slab Or Raised Floor? The Debate Is Virtually Guaranteed To Continue.

MUCH FUSS IS MADE over what's underfoot in data centers. But the debate is about much more than whether raised floors will continue to have a place in data centers. It's also about the best way to manage cables, cooling and airflow, and the increasingly heavy burdens encountered with high-density equipment.

Regardless of which side of the data center flooring issue you fall on, it's not a decision you can take lightly when building, renovating, or otherwise moving your data center.

Two Sides Make Their Cases

"I'm continually amazed that this debate is still going on. I don't see why we need raised floors at all," says David Cappuccio, managing vice

president and chief of research at Gartner.

"If you think about it, the reason we put in raised floors was to hide cables for mainframes. It just so happens that it creates a plenum used to transport air as well," he says. "Since mainframes went away, there's really no rational reason other than it's the way we always did things."

But based on his own experiences, Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), is an avid proponent of raised flooring. "While cases can be made for both methods, my experiences involving renovations, new construction, and consolidations of data centers have left me strongly in the camp for raised-floor data



centers and a preference for underfloor cabling," he says.

Raised Floor Flexibility

Koty says raised floors offer several advantages over slab flooring. "The thing about raised floors is they give you a lot of flexibility," he says. "They become an air plenum that, if properly managed, can be pretty good."

Plus, Koty says, you're easily able to run power and communication cables through a raised floor. If there isn't a raised floor, you're running cables overhead using a bus system. Koty says he's leery of bus systems because they tend to be proprietary, expensive, and inflexible. "Once committed to a bus system, you have limited options," he says.

Cabling overhead also requires access in and around structures such as ductwork and sprinkler heads and the use of a step ladder to install and maintain cables, Koty says. "I always felt

that there was more risk of an accidental disconnect from an overhead cabling mishap than underfloor. If any cabling has to be done overhead, it's best left to data cables, but my preference is to run both underfloor."

In addition, he says, a short in the bus system could take out an entire feed and possibly dozens of racks. If set up correctly, a short in an underfloor power cord or PDU would take out just a single rack.

Gartner's Cappuccio, however, says, if you want flexibility, raised flooring is "the absolute worst thing to do," particularly considering cable management over time. When a raised floor is brand new, he says, it'll look nice under the floor. But as time goes on and cabling and equipment are added or moved, "you get the spaghetti thing happening," plus as cabling gets more dense over time, it can also get more confusing.

Koty says proper cable management can solve that issue.

"It's The Way We've Always Done It"

Raised floors continue to be the dominant choice in data centers largely because IT department staffs are familiar with them. "As a company, we had extensive experience with raised floors. I knew them, my staff knew them, and our IT department knew them," says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com).

How do you counter the "It's the way we've always done it" mindset if you want a slab floor? David Cappuccio, managing vice president and chief of research at Gartner, suggests showing higher-up decision-makers how a data center on a slab floor would work. "Show how the floor is logically laid out without a raised floor. Show how it's cooled and how that type of cooling can be much more efficient." It can also help to reference major industry players that are building on slab, he says.

The High-Density Equation

Raised floors have thus far been OK for general data center use, where the space can be used for cooling and cabling, says Clive Longbottom, service director at Quocirca. However, he says raised floors have several potential problems as energy costs rise and data centers move to higher-density equipment.

“Firstly, they may not be strong enough to support the equipment—a collapsed floor is not a good thing to have in a data center. Secondly, they can hide a multitude of sins: poor cabling approaches with power and data next to each other, spare lengths just looped and left, etc.” Such problems, plus the potential buildup of “dust and fluff” can lead to the cooling air being blocked and not getting to the equipment, he says.

“Far better to go for ducted cooling and structured cabling with a well architected, flood-free floor system where flexibility of equipment positioning is guaranteed.”

Koty disagrees, however, saying that, even with increasing density, a raised floor can accommodate diverse heat loads throughout a facility.

A Question Of Airflow

The flooring debate brings up questions about cooling and airflow in data centers. Is a raised floor the most efficient way to

get cool air where it's needed? “No, it's not,” Cappuccio says.


“If you walk around the most efficient data centers today, they're on a slab and using hot/cold aisle containment,” he says. Cappuccio goes so far as to say that if you're going to put in a raised floor, you shouldn't put anything under the floor except air. “The key is unimpeded airflow. Still go with cable management overhead.”

Koty says the ability to use the area under a raised floor as a plenum is an advantage, but only if you follow proper cable management guidelines.

“With the addition of dampers, integrated fans, and directional airflow floor panels, the raised floor provides a perfect platform for supplemental cooling devices for optimal airflow control on an individual rack-by-rack basis.”

With a raised floor, he says, you have the opportunity to implement additional overhead cooling solutions, or even redundant cooling, if necessary.

Getting the raised floor height right is essential. “If you don't raise that floor high enough, you

might not be able to cool your equipment and you could reach a point where it won't cool things effectively.” Plan for a higher raised floor to provide a bigger plenum, and you'll have more flexibility and scalability for future needs, he says. 

When You Want The Data Center To Look Nice

If a nice-looking data center is important, then raised flooring may be your best choice. “If you're building a data center for aesthetics and to have it nice looking for tours, put in raised floors and put in white cabinets. It'll be beautiful, clean, and look nice,” says David Cappuccio, managing vice president and chief of research at Gartner.

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says in his experience, running power and data cabling underfloor ensures you can keep the interior space clean and neat. “Raised floors provide the kind of aesthetics that earned me many accolades from both management and customers. I wasn't the least bit embarrassed to offer tours of the data center.”

BONUS TIPS:

Consider The Expense

Cost is a big part of the debate over whether to use a raised or slab floor, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). “Raised flooring isn't cheap, and the higher you go, the more money you're going to spend.” When looking at the true costs, though, be sure to

account for the overhead cooling and cable management systems you'll need with a slab floor, he says. David Cappuccio, managing vice president and chief of research at Gartner, says there are other financial issues to consider beyond just the higher initial costs of a raised flooring system. Costs can include seismic leveling issues, additional insurance costs, building a needed ramp,

and the potential for needing a bigger or taller building.

Better Lighting

The overhead wiring systems needed with a slab floor can impact data center lighting, Koty says. “They tend to run under the light fixtures and cast shadows over the cabinets and work area.” Running cables under a raised floor lets you keep the data center clean and bright, he says.

Data Center Best Practices For Backup & Recovery

The Top Tactics, Technologies & Strategies You May Want To Implement

EVERY DATA CENTER manager knows the importance of backup and recovery. But that doesn't mean every enterprise is doing all it can in terms of its processes, testing, and efforts to implement more efficient strategies. Here are some tips related to backup and recovery best practices and implementing technologies and tactics other companies find successful.

Room For Improvement

Greg Schulz, senior advisory analyst at Server and StorageIO, says even enterprises with top-notch optimal conditions can improve or adapt their backup and recovery efforts to support new applications, tools, and technologies or enlist data protection where it should be. Companies using the latest, greatest hardware, software, and virtualization, for example, can still revisit items

such as service-level expectations, needs, wants, costs-to-deliver service, and ways to remove rather than cut costs, in addition to increasing durability while streamlining processes, testing, and more, he says.

David Hill, principal at Mesabi Group, believes the first imperative to improving backup/recovery processes is reducing what needs to be backed up.

Recent research, he says, indicates companies must preserve 1% of data for litigation, 5% for records required by law, and 25% for current business value. "That means 69% of all data has no business value," he says. Although deleting this data would be nice, actually finding it and getting permission would be difficult, he says.

Pinpointing data that doesn't merit any backup, he says, can greatly reduce cost and



management resources. Also, determine the data that's useful and fixed and place it in an active archive so users can still access it. He says enterprises only need to copy the data for data-protection purposes when they "ingest the data into the archive. That removes this data from the backup/restore process."

Consider Virtual Tape, Snapshots

Virtual tape is one of the most widely used backup and recovery approaches, says Clive Longbottom, service director at Quocirca.

"VTL was put in place to speed up BR [backup and restore], as backup periods were getting to be longer than the windows available to them," he says. "By backing up to disk but pretending it's a tape, backup can be speeded up immensely," as IT can check backups at disk vs. tape speeds.

Longbottom also says using snapshots rather than full

backups can provide more instant abilities for restoring a file because rather than losing everything that occurred between the last full (or incremental) backup and now, snapshots enable backing up files more regularly without overly impacting the server, storage, and network resources.

Hill recommends testing backups frequently and thoroughly enough as to instill confidence that IT can restore everything needed within SLA terms, something that's "easier said than done" because testing can't be disruptive and drain personnel resources. Software can help test on essentially a continuous basis, he says, though this can be costly.

One problem with testing is it involves the backup copy on disk or tape and servers that must run the applications that are restored, "otherwise, how do you know that it worked?," he says. "A disaster recovery site might provide the right

Enable Self-Service

Quocirca Service Director Clive Longbottom advises moving from a help-desk-driven data restore model to self-service one. "Mirror a user's data with a degree of versioning in a simple manner so that the user can recover an individual file as needed from an easy front end," he says. "As far as possible, divorce the files and data from the desktop (which should be centrally hosted as a hybrid VDI model anyhow), so that should the user's device be lost, stolen, or otherwise compromised, it isn't a case of having to wait for a restore of an image onto a dissimilar device."

support,” he says. Also, if backing up to the cloud, the vendor may have testing strategies. “Unfortunately, testing often isn’t done as frequently or as well as it should be,” he says.

Schulz advises testing “beyond the component level,” or going past restoring a file, volume, or object and checking that data can be opened and used; restored to an alternate location; verified for contents, decryption, access control lists, and other security or access controls; and have permissions restored. Periodically check testing procedures to ensure you have copies and they’re the right version or generation.

Look At Current Tech In New Ways

Hill says a market is growing for backup/recovery that meets needs related to server virtualization and backing up to the cloud. “Traditional products may or may not play in these two non-traditional markets.”

Although deduplication is a powerful, valuable trend, Hill says, “it’s not a panacea for all the changes that are happening.” He does consider software that can help monitor protected data, issue alerts when a backup fails, and work around bottlenecks as essential.


Schulz suggests enterprises use current technologies and tools in new ways rather than as replacements or using them in the same ways as predecessors.

“For example, if tape was used for hourly backups and now disk is doing that role, why is an hourly back-to-disk occurring?” Instead, consider moving to hourly or 30-minute snapshots and then a daily backup disk-to-disk or disk-to-cloud. He also suggests breaking free of using siloed data protection or having separate groups work with backup administrators in an uncoordinated manner. Align these and streamline processes in order to do more in less time and remove complexity and costs, he says.

Aim For Business Continuity

Longbottom says enterprises should regard backup and recovery as a last resort. “The main aim should be for business continuity, which requires something a bit different to BR,” he says. BR should be more a part of an

archival strategy for governance, risk, and compliance reasons, whereas areas such as accidental file deletion; accessing earlier document versions; and stolen, lost, or failing devices will require a different approach that enables rapid regain functionality through self-service.

“BR shouldn’t be regarded in the way it was, say, five years ago—it’s just a means for long-term archival of data. Now, we need to look at online and near-line data mirroring so that the business maintains operational capabilities through any issue,” he says. 

Think Through Service-Level Agreements

Mesabi Group Principal David Hill says thinking through SLAs—whether an agreement with users or for IT planning purposes—is critical if moving to a “true cloud where real SLAs are essential for IT as a service.” Achieving these SLAs means thinking through what QoS metrics are needed. “Notice that the SLAs with their QoS metrics aren’t the same for all applications. For example, the RTO and RPO should be more stringent for mission-critical applications than for less time-sensitive applications,” he says. “This means ranking how applications will be recovered if needed, as treating all applications equally would cause data protection costs to rise.”

BONUS TIPS:

Keep Things Simple

Quocirca Service Director Clive Longbottom says centralizing desktops through a virtual desktop infrastructure (VDI)-style approach (“well, a hybrid one including the use of application streaming or paging”) puts everything in the data center and then allows data management to be run against a more constrained set

of assets. Mirroring, combined with backup and recovery, then becomes far easier and effective for end users and the business, he says.

Do More Than Cut Costs

Server and StorageIO Senior Advisory Analyst Greg Schulz advises looking “beyond the temptation to simply cut cost around backup/data protection” and instead focus on cost removal. Also look for and

eliminate complexity, streamline processes, reduce data footprint with archiving, and use other techniques in addition to “reducing what actually gets protected with compression and dedupe,” he says. “Not everything is the same in the data center or information factory—from applications, service requirements, threat risks—so why treat data protection the same for everything?” he says.

Time A Server Refresh

There's More To Upgrading Than Waiting For The Latest Technology To Arrive

EVEN AS SERVERS continue to take on the demands of ever-growing volumes of data, for budgetary and other reasons, it may seem cost-effective to simply allow the server's replacement cycle to gradually extend beyond what usually would be acceptable.

If you're operating by this rationale, it's probably time to take a look at your server refresh game plan, primarily because extending the life cycle of servers can put your hardware at risk for failure and delay critical software upgrades. Here's a look at the importance of timely refresh cycles and what you can do to make the best decisions for your organization's servers.

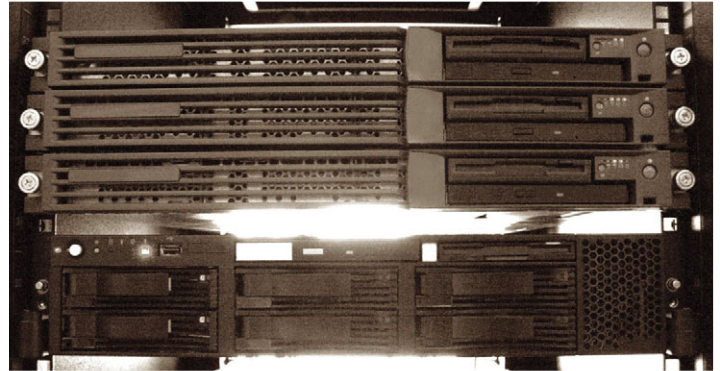
The State Of The Cycle

Mike Matchett, senior analyst and consultant at Taneja Group, says that the standard three-year cycle is being

stretched because of the downward economy and the fact that skilled IT labor is at a premium. Even so, the impact of a refresh has evolved.

"Due to virtualization pooling many workloads on each server, a server refresh in and of itself doesn't really give the end users as much of a visceral 'oomph' anymore," Matchett says. However, "if the challenge for refresh is now about increasing virtual machine density to lower TCO, then timing is a matter of balancing efficiency with costs on the back end, invisible in most ways to end users."

Dan Olds, principal analyst at Gabriel Consulting Group, says, "I don't know that there's a universal feeling that extending refresh cycles is absolutely 'good' or 'bad'. Of course, the vendors would like to see faster refresh cycles, but it doesn't always make sense for the data center."



Olds says although we're seeing a general trend of lengthening server cycles, it's not the same across the board. "Some systems, like those supporting new and emerging trends [such as] predictive analytics and big data, are probably kept at or near the cutting-edge of performance and reliability, availability, and serviceability (RAS)."

Consider The Risks

When your priority is staying on top of maintenance and hardware, there is a danger to waiting too long to refresh, Olds says. In fact, the cost of maintenance and spare parts can skyrocket in only a few years, he says. "This can be a very unpleasant surprise when there's a failure or when it's time to renew maintenance agreements."

Taneja Group's Matchett says it's never too early to think about a refresh if circumstances call for it. "Once a server is in place, it's a

Key Points

- The three-year server refresh cycle is extending, but that doesn't mean you should wait as long as possible to upgrade.
- Higher cost of maintenance, poor performance, and unpreparedness for server failure are several risks of delaying a server refresh.
- Whatever you do, make a plan.

Get Started

According to Dan Olds, principal analyst at Gabriel Consulting Group, data center chiefs need to consider a range of factors when determining whether a server refresh is necessary. "In some cases, the difference in power consumption and the number of virtual machines a new system can handle for a given amount of money is enough to justify the purchase," Olds says. "Other purchases can be justified by higher performance and faster processing, which leads to higher profitability." Depending on the workload, you can stick with what you already have or do an "in-place upgrade with hand-me-down systems" elsewhere in the enterprise.

'sunk cost,' so if it needs to be replaced, the replacement question should be looked at independently of that sunk cost. If a refresh is justifiable, it should be pursued," he says.

"If the next generation of servers is cheaper to maintain and operate, then you might lose out by not refreshing when it's justified. But the problem for server vendors is that well-built equipment doesn't simply expire on a given date."

Actually Plan Ahead

How and why you should implement a server refresh may be more of subjective matter, but choosing when is more about having a practical plan in place. This means you need to monitor your own enterprise equipment and keep a finger on the pulse of data center server trends.

Olds says companies should keep track of developments in the industry and how they might relate to their own unique needs and infrastructure, especially when it comes to assessing application performance.

“Every firm has some set of apps that suffer from bottlenecks of one type or another,” Olds says. “They also have apps that are mission-critical and need the highest levels of performance and stability. These are the apps that can most benefit from an early refresh, but only when the technical improvement in terms of performance, energy consumption, or RAS justify it.”

Keep in mind that simply because you can justify your upgrades doesn’t mean you’ll feel comfortable with instigating such a significant transition. Matchett says you’ll likely feel “like you’re pulling the trigger at the wrong time and just missing the next big improvement.”

He also says, however, not to worry about what’s beyond

the horizon as much but instead focus on the reliability of proven solutions.

“Realize that even though computing density is increasing and relative power consumption is declining with each server generation, that data under management is growing and there will always be opportunities to deploy new workloads to fill back in,” Matchett says.

In the most basic preparatory terms, Olds advises ranking refresh needs from most to least critical. “I would have a refresh plan in place and keep it up to date.” In essence, your plan would estimate both the quantitative benefits and costs of a refresh. **P**

Action Plan

Look at performance per watt. Although it’s important to consider overall server performance, Jag Bolaria, senior analyst at The Linley Group, says you need to examine server, hardware, networking, and distribution of power costs. “On the basis of that, IT managers want to look at not just performance, but also what the performance per watt is (i.e. how much performance am I getting for a certain amount of power).”

Consider the big picture. “If you can do a refresh, you want to look in terms of the bigger context of your data system and not just one machine,” Bolaria says. In fact, the reliability, availability, and serviceability (RAS) talk is becoming less important, he says, because if you’re scaling and you have a large data center, you can put in lots of servers, and then, if one goes down, you can switch your workload to a different server.

Top Tips

Be in planning mode at all times. According to Mike Matchett, senior analyst and consultant at Taneja Group, planning for a server refresh isn’t a one-and-done project, but it instead involves ongoing assessments. “Capacity planning and architectural evolution planning should be constant processes,” he says. “Baseline new deployments and track the events and costs that can creep up over time as equipment ages.”

Consider all factors. Jag Bolaria, senior analyst at The Linley Group, says risks associated with when to perform a server refresh depend on both the enterprise and platform. For a financial institution, for instance, performance is critical and latency can make a big difference. New flash technology or memory can make a difference, as well, and the next Windows upgrade could improve flexibility and performance, he says.

Pay attention to software upgrades. “If you’re a Microsoft shop, for example, then you want to see when the next release is,” Bolaria says. “Try to synchronize your upgrade from compute with the system-level software, then you won’t have to go through another round of system-level software upgrades six months after you just put in new hardware.” In other words, don’t get caught in the lag.

Reduce Your Reliance On Enterprise Passwords

Better Authentication Can Mean Improved Protection Of Enterprise Assets

THE PASSWORD IS FAR from dead, but many experts feel that password authentication alone is no longer sufficient for authenticating certain levels of access.

“The authentication systems we’ve seen for 10, 20 years have been really stagnant,” says Frank Dickson, Frost & Sullivan industry principal. That said, Dickson does believe we’re at the precipice for the arrival of new, innovative methods for strengthening authentication. When they do, it will be the consumer space that drives them into corporate environments, and most likely it will be smaller businesses that see this first, Dickson says.

One of the keys to overcoming issues with passwords is to investigate and implement options to reduce your reliance on them.

Passwords Today

When it comes to traditional passwords, Bob Tarzey,

Quocirca service director, says “any security is better than none.” But compromised accounts stemming from poor password practices, especially those involving privileged users, pose great danger to enterprises, he says.

Michela Menting, cybersecurity senior analyst at ABI Research, says today, publicly available “rainbow tables” are the first tool hackers use to crack passwords. Since attempts to acquire hash values of passwords began, she says, the tables have grown “to the point where it’s likely any password below 12 to 14 characters now most likely has its hash value registered somewhere in a rainbow table.” So while password authentication is still popular, “it’s more easily hackable every day,” Menting says.

This is one reason why it’s critical to know the level of



access an enterprise password is granting. For example, a password alone may be sufficient to allow internal employees to log on to trusted systems.

For remote users and privileged users, however, James McCloskey, senior consulting analyst at Info-Tech Research Group, says we’ve pretty much reached a point where organizations are saying a password isn’t sufficient. “In those cases, we’re starting to see much more uptake of multifactor authentication as an approach. Whereas for internal users accessing non-sensitive systems, we’re starting to see alternatives to passwords for the primary means of authentication.”

Better Authentication

The big takeaway when seeking to strengthen authentication is gaining at least some protection against phishing attacks, McCloskey says. More organizations in sensitive industries such as financial and insurance intend to move internal users

Key Points

- Implementing too many requirements around passwords may lead employees to attempt to usurp them.
- Mobile phones are increasingly considered a solid authentication option, because almost everyone already has one.
- Authentication options include biometric readers, hard/soft token generators, and network/contextual-based information.

from using passwords alone because of the risk of client confidential information being stolen using IDs and passwords obtained via phishing.

Common authentication options such as biometric readers, facial recognition, hard token generators, and one-time password tokens “aren’t the kind of things that can be phished easily,” he says.

McCloskey says biometric readers are a viable second

Get Started

Frost & Sullivan Industry Principal Frank Dickson says a good place to start enhancing password authentication is by enforcing password sophistication. Rather than allowing “12345,” for example, require the use of 12 to 14 alphanumeric characters along with capital letters and special characters. He says contextual risk-based authentication options are generally cost-effective and software-driven while integrating well with identity access management and being easier to administer. Quocirca Service Director Bob Tarzey says password-management software, or password wallets, can help alleviate some annoyances that occur when passwords are changed often or users must juggle too many complex passwords.

authentication option to passwords, particularly as many business-grade laptops ship with an integrated reader. Drawbacks can include expense and employees with philosophical objectives to biometric usage.

Dickson suggests smaller enterprises seeking to reduce reliance on passwords look at network or contextual authentication options, which provide IT numerous possibilities without placing more onus on users. Dickson says by combining a password with checking the IP address of a user's device, for example, you can create multifactor authentication.

Single-sign-on (SSO) solutions are the same as multifactor authentication but do help reduce how many passwords a user must remember and how many times he must provide authentication. Tarzey says availability of cloud-based SSO services is increasing, with some solutions assisting with user provisioning, configuring, ensuring orphan and default accounts aren't left open, and more. If implementing an SSO solution, McCloskey cautions, require that more than a password is needed to authenticate access.

Overall, McCloskey says a cloud-based SSO solution can make sense for organizations moving various services to the cloud and wanting someone to broker authentication to them rather than do it

themselves, "which can be a lot of overhead."

Mobile Phones


Many experts tout the mobile phone as a solid authentication option because of the ability to enable the use of one-time passwords (OTPs), in which a password is automatically generated and sent via SMS to the user for a single transaction or session.

Menting says an OTP is more secure than a static password, especially a user-created password, which is typically weak. "OTPs can replace authentication login information or can be used in addition to it to add another layer of security."

Using smartphones as soft-token generators for authentication really provides a replacement for traditional hard token generators such as a USB stick, which can cost \$50 to \$100 per unit but the user may not necessarily always carry, unlike smartphones, McCloskey says. "You're using a device that people already carry, and you get a lot of security benefit with little headaches," he says.

Dickson hails the mobile phone as "probably the next great authentication device of the future," citing its integrated security, connectivity, and sophisticated computing platform. "In terms of authentication, it has all the necessary components to provide some of the greatest authentication you

can probably provide," he says, though we're just scratching the surface in terms of capabilities. A "whole host of new

authentication solutions are coming through the pike but are just absolutely brilliant," he says. 

Action Plan

Size up. Ask what levels of access you require to authenticate various users.

Change. Regularly change passwords (every four to six months, for example).

Get complex. Require passwords to be sufficiently complex (14 or more characters mixing alphanumeric and special characters, for example).

Don't double-up. The same password shouldn't be used more than once.

Top Tips

Lengthen. Forcing employees to use longer minimum password lengths for accessing enterprise systems can help make passwords less susceptible to brute-force attacks. More experts now suggest enterprises push for the use of "pass phrases" (a familiar line from a book, for example) in place of passwords.

Prevent. By strengthening authentication, you may end up increasing or introducing a new level of inconvenience for users. If too much inconvenience is introduced, users may resolve to using shortcuts to usurp it, such as simply writing passwords down on a note and posting it to their monitors.

Educate. Even when enforcing requirements in order to strengthen enterprise passwords, passwords can essentially be made to be worthless if a user gives them up to a phishing attack. Education and training should be a part of any enterprise's policy concerning passwords.

Make The Most Of Enterprise Virtualization

Where To Begin & Where To Go Next

VIRTUALIZATION has been around for quite some time, which means that most companies, big or small, have probably embraced the technology to some degree. However, taking advantage of virtualization involves much more than consolidating a few servers and improving server efficiency. It helps to build a solid foundation, but from there, you have to think outside the box to receive all the benefits virtualization has to offer.

Application Profiling & Consolidation Ratios

Dave Bartoletti, principal analyst at Forrester Research, says the first step is to take inventory of your applications to see “what resources they’re actually using—not what you’re giving them, but what they’re actually using.”

Bartoletti says that the best candidates for virtualization

are often the ones that aren’t using all of the allocated resources and simply aren’t as efficient as they should be. Take for instance an application running on a physical server with a lot of memory and disk resources allocated to it. That application may “only be using 5% of the CPU on average and is using very little memory.”

Bearing this in mind, companies need to constantly monitor their consolidation ratios, Bartoletti says, and know how well every virtualized host is using the available resources.

“Make consolidation ratios and performance management regular parts of your IT operations process,” he says. “On a weekly basis, you should be able to write a report to say, ‘we have consolidation ratios of about five virtual machines per server and our servers are



utilized to this percentage.’ You’re always looking for places where you might not have done a good job with consolidation the first time and have opportunities to consolidate more.”

Life Beyond Consolidation

A common misconception about virtualization is that it’s synonymous with consolidation. And although consolidation is a major benefit, it isn’t the only one.

Greg Schulz, senior advisory analyst with Server and StorageIO, says physical server consolidation is often the “low-hanging fruit” when it comes to virtualization and that some companies have already virtualized as much as possible, but are still looking for more ways to improve.

For those companies that want to move beyond the base benefits of virtualization, Schulz recommends looking at things like application agility, resource flexibility, and

Key Points

- Pick the right apps for virtualization and make sure you are constantly evaluating your consolidation ratios.
- Think about use cases outside of consolidation and don’t rule out mission-critical apps and systems.
- Use virtualization to improve efficiency throughout the company as well as for proof-of-concept projects.

even disaster recovery and business continuity.

“If I’ve already done some server consolidation, I could maybe use virtualization to set up a second site that’s active or on standby mode, but I can use virtualization to move things over more dynamically than I can now,” says Schulz. “Or, I have that ability where I can go in and virtualize a server, system, or application so that it becomes

Get Started

Once you decide which applications you want to virtualize, you should “establish a test bed so you can do some proof of concepts, prototyping, and figure out how your tools will work in that environment,” says Greg Schulz, senior advisory analyst with Server and StorageIO. He adds that whether you’re a small company with a few employees or a large organization with hundreds or thousands, it’s crucial to make sure that an application will make the transition to a virtualized environment without negatively impacting performance or efficiency. “It’s all about gaining experience,” Schulz says.

more portable and I can pick it up and move it, whether it's for upgrades, maintenance, failing over, business continuity, disaster recovery, and things like that. It starts to open up new doors."

Optimization & Proof-Of-Concept Testing

Another way to differentiate the advantages of virtualization and consolidation is to look at the network and storage optimization tools that are available in many of the modern hypervisors used today.

"For example, you might have virtualized servers and they're all in a shared storage environment," says Bartoletti. "You might decide that for better performance, you want to use the memory that's on the VM or local storage on the server itself."

Bartoletti adds that there are a lot of tangential benefits to server virtualization. "Most modern hypervisors let you use local disk, not just remote or shared storage, to increase the performance of VMs running on a particular server," he says.

Schulz says that virtualization can also be used to develop proof-of-concept projects that may not even be tied to virtualization. For instance, in his environment when he plans to test a new piece of software and needs a separate operating system


and environment, he'll "spin up a new virtual machine, download all of the software, and try it out, rather than go and buy another server."

This is a great way to test out a new application or system without jeopardizing the rest of your infrastructure, ensuring it will run as expected when you deploy it.

Consider Mission-Critical Applications

Bartoletti says that some companies decided against virtualizing certain applications in the past because they thought it was too risky, but he explains that what was once considered risky is "probably much safer today."

For that reason, Bartoletti recommends that companies "look at those applications that are more business-critical, performance-sensitive, and performance-hungry," because "there aren't that many core business applications that you can't run in a virtual machine."

And if you're worried you don't have the skill or expertise necessary to take on these tasks, you should work with your vendors and ask them for reference customers that are also virtualizing those business-critical apps, he says. They should be able to give you a starting point and help make sure your implementation is as seamless as possible. 

Action Plan

Choose your applications. Decide which applications would benefit most from virtualization. Don't only focus on low performance applications, but also consider which mission-critical systems might thrive in a virtualized environment.

Build a test environment. Create a test bed where you can load up virtualized applications and test them in a real-world environment. Put them through their paces and make sure you don't negatively impact performance.

Start small. When you actually deploy a virtualized application, start with something small before ramping up to larger systems. It's important to constantly test and refine along the way so you don't damage the user experience.

Top Tips

Virtualization makes cloud migration easier. Dave Bartoletti, principal analyst at Forrester Research, says that all public cloud infrastructure is virtualized and those services "are well-designed for applications that are already virtualized." If your company plans to embrace the cloud in the future, you should virtualize your applications now. "It's much easier to move a virtualized application into a cloud and run it there than it is if it's still running on a physical server in your environment," he says.

Improve resource flexibility. Greg Schulz, senior advisory analyst with Server and StorageIO, says virtualization can go beyond consolidation to improve the utilization of your equipment. "If I find out that a high-performance application is only busy from 8 a.m. to 5 p.m., why don't I put virtualization on the server, push all of the other VMs off during the daytime, and then at night start moving reporting, analytics, maintenance functions, and other VMs that may be set on a slower machine during the day," he says.

Build A Better Data Center Through Careful Planning

Put Your Company On The Right Track By Avoiding These Common Design Mistakes

PLANNING FOR THE FUTURE in any capacity of life can be a daunting, unpredictable, and complicated task. Planning for everything that goes into designing a new data center space or renovating an existing space is certainly no exception.

Get the design right, and you'll create a foundation that can meet present needs but also expand to accommodate the company's future growth and demands. Get it wrong, and the enterprise can sink under unforeseen costs; unstable reliability; and insufficient cooling, power, and capacity.

Avoiding mistakes when designing a new data center space entails a great many things going right, including bringing together all the proper parties to inject the necessary input, forecasting and obtaining the correct budget, making certain you maximize the space you build, and simply identifying what your enterprise's function

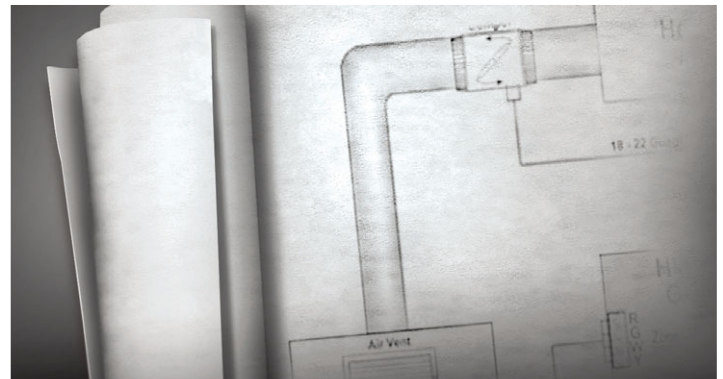
is now and will be in the future so the data center can adjust to any unique requirements that surface.

Use Your Time Wisely

Designing a new data center space means simultaneously managing countless details, including those related to the layout of the physical space, the power coming into the facility that will run equipment and components, the cooling that will keep the equipment and components operating safely, the setup of the equipment, and all the considerations tied to reliability, provisioning, and capacity.

Because there's so much at stake, it makes sense to obtain all the necessary planning details and intricately define your enterprise's goals for the new space before moving forward. But this isn't always the case.

Jenna Maertz, consulting analyst at Info-Tech



Research Group, says a large number of those enterprise personnel involved in designing new or renovating existing data centers wish they'd spent more time planning.

In general, Maertz says, Info-Tech finds that more than 80% of its clients end up regretting they didn't spend more time documenting and identifying facility requirements during the initial project scoping that their companies conducted.

"You would be surprised how many times clients don't create initial budgets," Maertz says. "You should be creating a budget that shows engineering fees, permits and variances, contractor fees, equipment costs, and related system upgrades at a minimum."

Where renovating data center space is concerned, Maertz says a common mistake is simply waiting too long to do so. "Renovations that are completed earlier

in the data center life cycle are generally less expensive projects," she says. Maertz's advice is for enterprises to "upkeep instead of overhaul."

Get The Right Help

Most likely, small and mid-sized enterprises won't have a designer on hand who has the experience and training required to address every aspect of designing a new data center space. You will often need to hire designers, consultants, and contractors. A third-party consultant, for example, can provide an outside perspective and help spot issues and potential future roadblocks that might otherwise go unnoticed until it's too late.

The biggest mistake when obtaining third-party resources is using parties that are more familiar working with general office spaces and not data centers, Maertz says. "You might save a few dollars, but data

Don't Come Up Short

One of the most difficult aspects of planning a new data center or renovating existing space is creating an accurate, reasonable, and future-thinking budget. In this regard, Jenna Maertz, consulting analyst at Info-Tech Research Group, says to be sure you don't underestimate the cost of cooling and standby power. "We see lots of clients lowballing the total cost of these two areas, and it has a real effect on their budget."

centers have different, more stringent code requirements,” she says.

She advises starting the project off right by using specialized resources. “And even when you hire specialized contractors, ensure that you are still managing and monitoring them on an ongoing basis,” she says. “Take photographs to document progress so you have a complete record. Meet regularly with the contractor and ensure someone is acting as a site manager.”

Maertz says it is also important to obtain reference checks for any prospective contractors. “This is a big project, and you want to get it right the first time. A good contractor should have references from similar jobs” with requirements, size, and complexity comparable to your project.

Use DCIM

When tying together and effectively managing various elements of a data center, Anu Cherian, senior industry analyst for power supplies at Frost & Sullivan, says a data center infrastructure management (DCIM) solution can prove beneficial.

By integrating various data center elements, such as power and cooling, and by providing an interface that’s user friendly for data center managers, a DCIM solution can provide

“visibility into optimization of space, optimization of energy based on identifying exact hot spots, and mitigate downtime by providing real-time data on operation of various equipment in the data center,” Cherian says.

Cherian says through this multifaceted approach, DCIM solutions are becoming “a key component in enabling better management of the data center primarily from a space, efficiency, and maintenance standpoint.”


Factor In The New

Whether you’re building a new data center space or renovating existing space, factor in how your reliance on newer and developing technologies, such as virtualization and cloud computing services, will impact future space needs.

Maertz says that although many analysts and clients “are of the belief that the data center as we know it (in the physical capacity) is on its way out,” what they neglect to consider is “that even the cloud is a data center.”

That said, she cautions that newer technologies and advances might mean that the amount of data center

space an enterprise requires now could shrink in coming years, thus the enterprise may want to consider incorporating a modular approach in its design.

“You might need 4,000 square feet this year and only 1,000 in five years,” she says. “Plan your data center with the possibility of downsizing in the future.” 

Know Your Function

Knowing what your enterprise’s actual function is as a business plays a major factor in identifying how you should build a new or renovated data center space. In other words, an enterprise that greatly relies on a private cloud strategy will have different data center needs and requirements than, say, a startup that will predominantly rely on public cloud services for its infrastructure needs.

BONUS TIPS:

Get The Right Input

When building a new data center space, acquire input from all parties that can lend informed and valuable insight concerning not only facilities but also operations. One common mistake, for example, is that enterprises fail to involve operations teams in facility-related designs and draw upon their experience in

soliciting opinions concerning sufficient space, accessibility to equipment, and more. Simply asking data center employees what they dislike about the current space, for example, can help create a better new space.

Use What’s Around You

When designing a new data center, some enterprises prefer to hold on to as many design elements of the

current space as possible simply because they are familiar. Although this can be fine in some respects, it can also cause an organization to not adopt changes that would prove beneficial in the long term, such as incorporating green data center design aspects or taking advantage of free-air cooling resources that could reduce power-related cooling costs in certain geographical locations.

Trends To Watch In The As-A-Service Arena

With New Offerings Changing The Face Of IT, Enterprises Should Choose A Provider Wisely

THERE WAS A TIME in the developmental history of information technology when the term “as-a-service” (aaS) arrived on the data center scene with just as much intrigue as wearable technology. These days, however, it seems as though both startups and established corporations are rolling out an increasing variety of cloud offerings that are steeringaaS trends.

IT managers will recognize the benefits of software-as-a-service and infrastructure-as-a-service offerings, but a number of new offerings are likely still obscure to many decision makers. We’ll explore some of the new as-a-service trends and how they may impact the way your enterprise operates.

The As-A-Service Market Is Growing Fast

When you start diving deeper into the pool of current and developing as-a-service offerings, it becomes clear that particular types of solutions are becoming more customized, yet they remain in the entrepreneurial realm.

While as-a-service initially focused on mainstream applications, platforms, and infrastructure solutions, Pund-IT Principal Analyst Charles King says, “we’ve seen a shift toward more specialized offerings. In one sense, that’s a natural evolutionary track for IT to follow.”

King says you now see vendors exploring a range of speciality offerings, such



as “discrete services for data storage; business intelligence (BI), including big data and Hadoop; virtual desktops (basically cloud-enabled thin clients); and business applications tailored for/delivered to smartphones and tablets.”

According to Wayne Pauley, Ph.D., senior research analyst at Enterprise Strategy Group, we started seeing the beginnings of managed cloud services last year. It’s an interesting phenomenon because “it bridges the gap for the enterprise that, A, doesn’t have the talent, training, or experience, and, B, doesn’t want to be fully liable for anything that goes wrong.”

Another new as-a-service area, Pauley says, is disaster recovery as-a-service. Some companies are even offering security- and compliance-as-a-service, he says. “There is one company I saw that was offering firewall-as-a-service. Not just the traditional low-level firewall

rules—it’s more of an application layer firewall-as-a-service.”

Choose A Provider & Follow Through

To simplify the concept ofaaS offerings, consider what Pund-IT’s King says: “The basic sales pitch foraaS is that purchasing a service is easier, simpler, and cheaper than buying and supporting a similar solution internally.” This doesn’t mean that transitioning your data center operations to the cloud is simply a matter of signing up for a single cloud-based service.

Pauley says there’s a lot of work involved in converting a data center into the cloud, including new software and new integration, especially if the data center has been used to managing things with a best-of-breed approach.

“I’m not sure that’s going to work very well when the complexity gets to the point where you try to take fairly singular and fairly homogenous

How Will Such A Solution Make A Difference?

Charles King, principal analyst at Pund-IT, says the most important thing for enterprises to determine is whether and how an as-a-service (aaS) solution differs from what the company is already supporting.

In many cases, King says, it could either be equal or even superior to what an enterprise already uses. “But in other cases, engaging anaaS provider can result in significant changes in application availability, resiliency, and security. It’s also important for companies to be proactive in their shopping foraaS,” he says. “The market is evolving so rapidly that it’s critical for businesses to be aware of and understand all the possible options.” King also recommends avoiding long-term contracts or commitments. “In this market, it’s all too easy for this year’s leader to become next year’s laggard.”

infrastructure and software and now run it more heterogeneously with some on-premises and some off-premises.”

Pauley says that some companies offer full cloud management packages that support configuration management database (CMDB); orchestration; automation; and governance, risk management, and compliance (GRC) offerings all in one package.

“There are quite a number of choices out there for enterprises, but they need to place their bets on one of them and go with them,” Pauley says. “Do your homework and place your bets and stick with it because it’s too complex to be changing horses anywhere after the race has started.”

Tech Advancements Meet Business Decisions

If you’re ready to invest in an as-a-service offering, Michael Karp, vice president and principal analyst at Ptak Associates, says the first point is to understand that it’s not all about the technology—in fact it’s a financial decision, like many choices that impact an enterprise’s future.

“In almost all cases, people look to do things that don’t make financial sense to do on their own,” Karp says. “If people start to look for services from an external provider, what they need to do is determine if it makes business sense to go outside the company.”

For example, if you plan to implement new analytical software that relies heavily on the expertise of mathematicians and data scientists, you can use a service that provides that expertise, according to Karp.


“Break this down into a business decision. It’s not just cost that’s involved, but it’s also the return you get and the value you extract from the relationship. Maybe it costs a little more to go outside the company, but it could be 50 times better,” Karp says.

“If you buy services, you’re buying a level of service,” Karp says. This means somebody else does the testing for you, and you make a business decision.

What’s Ahead

In the future, Pauley says, we’ll see “new players that pop

up and go after niches.” Plus, he says, we’ll likely see smaller companies use the cloud for backup and disaster recovery. Larger companies, which tend to

have a larger portfolio of applications, Pauley says, will likely retool and possibly incorporateaaS offerings as those applications are retired. 

Trust Your Provider—The Others May Not Survive

In the very near future, you might see a surplus of as-a-service vendors, and Wayne Pauley, Ph.D., senior research analyst at Enterprise Strategy Group, says there will be a clear set of winners in this game. “A lot of these guys are going to go belly up. I don’t mean that in a bad way, there are just too many people jumping into the business of it, and it’s going to have its fallout.”

Because too many providers are rolling out fairly similar offerings, the end customers need to look at the viability of the cloud service business they’re partnering with or use a multivendor approach for protection, Pauley says. “It’s incumbent on enterprises and SMBs to do their homework—that they know they’re doing business with someone that will survive and that’s viable. Or they need to have to have plan B in effect where they can fail from one provider to another and have both of them running.”

BONUS TIPS:

High-End & Economical Offerings Coexist

Wayne Pauley, Ph.D., senior research analyst at Enterprise Strategy Group, says although there’s certainly a higher-end tier of cloud service companies that offer as-a-service options for the Fortune 1000, there’s “another tier of cloud providers that have come up with a viable economic model for them to

be in business and go after the SMB and mid-market.” How does it work? Pauley says they don’t build the cloud data center themselves, but rather they “colo in it and they build the cloud inside it.”

Buying A Product vs. Buying A Service

There’s a profound change that’s accompanying the increasing availability of as-a-

service offerings, according to Michael Karp, vice president and principal analyst at Ptak Associates. The big deal with as-a-service, he says, is that if your company has been around for 40 years and you’ve had IT for 30 years, you’ve spent 30 years buying *products*. What’s changed? You’re now buying *services* such as platform-as-a-service and business-process-as-a-service.

Dispose Of Servers & Components Responsibly

Protect Sensitive Data, Your Brand Equity & The Environment

AT ONE POINT OR ANOTHER, every data center disposes of servers and other equipment to make way for new technology.

Although this process may seem like an afterthought and simply part of doing business, it's important to make sure you dispose of your equipment in a secure and environmentally friendly manner. Building a relationship with a reliable IT asset disposition (ITAD) provider is a start, but it's ultimately up to you to ensure your data isn't stolen and that your equipment doesn't end up in a landfill.

Find A Certified ITAD Vendor

The first step in choosing an ITAD vendor is searching for

one that is either e-Stewards or Responsible Recycling (R2) certified. Both of these organizations "certify that an ITAD vendor's processes conform with some pretty strict rules and guidelines when it comes to disposition of assets," says Rob Schafer, research director at Gartner.

He says the certification requirements of e-Stewards and R2 overlap by about 90% and notes that if an ITAD vendor is certified, it means it has "gone through a reasonably rigorous audit and its processes are robust enough to qualify for certification."

R2 and e-Stewards perform audits each year to make sure those processes stay up to date,



but Schafer says that may not be enough for all companies, especially those in highly regulated industries.

"I know of a number of financial and healthcare companies that are especially paranoid about this issue and do their own audits and have their own security folks who show up unannounced to check the local facility of the vendor," Schafer says. "That's a luxury that a lot of smaller companies just don't have, so the best practice is to, at the very least, make sure that your ITAD vendor is either e-Stewards- or R2-certified."

Follow The Chain Of Custody

Companies in highly regulated industries likely have to consider security more than others, which is why they need to know where data sanitization is actually performed. But all companies could benefit from getting a solid understanding of an ITAD vendor's chain of custody and how your

servers and other equipment will actually move through the disposal process. You have to think about whether you need to perform your own data sanitization onsite before sending it to a third-party facility, or if you want to rely on the vendor to perform the task.

The chain of custody usually means that your equipment "goes from you to some trucker and from that trucker directly to the facility," but Schafer says there is a lot of variation in exactly how direct that chain of custody is.

"The Cadillac solution is it's sealed at your location and goes directly to the ITAD vendor's facility and is only unsealed at that location, so it's a point-to-point delivery," he says. "That's very costly, but very secure. The other end of that spectrum is some generic local trucker who stops by, and you're the 12th stop of 18 stops. He has furniture, kitchen equipment, and your stuff.

Be Careful With Onsite Data Sanitization

Some companies perform data sanitization onsite, but that can lend itself to complacency, says Rob Schafer, research director at Gartner. For instance, the person performing the job may have other tasks and might only run a one-pass wipe, which can be inconsistent, he says. If you put checks in place to ensure the data is properly wiped, this approach will work for some companies, but others may need help.

"If you decide on premises, do you do it yourself and maintain that robust data sanitization expertise in-house or do you have a third party do it?," Schafer says. "There are a number of companies that pride themselves on onsite data sanitization, but it is more costly. Typically, it makes most sense to have your ITAD service provider be your data sanitization vendor, because they're already dealing with those assets."

It's less secure, but also less costly." The key is determining how much internal responsibility you want for wiping your own data and how much risk you are willing to accept.

Ensure Proper Disposal Of Hazardous Materials

Kyle Bittner, business development manager at Ex-IT Technologies (239/596-2254; www.exittechnologies.com), says there are many environmental concerns around IT asset disposal, noting that a server's green printed circuit boards (PCBs) and batteries contain hazardous materials. "The motherboard, PCI cards, memory, hard drives, and processors all have PCBs that may need to be separated from other metals for recovery."

Bittner says the current RoHS standard lowers the amount of lead, mercury, and other hazardous materials in PCBs, but the standard only went into effect in 2006, so some companies may still have equipment onsite that has higher concentrations of those hazards. For that reason, it's important to again make sure your ITAD vendor is R2 or e-Stewards certified to follow the right processes and ensure those hazardous materials don't harm the environment.

Know That Refurbishing Isn't As Profitable As It Once Was

Data centers used to be able to ship their servers and other

equipment to a third-party vendor and end up not only breaking even through refurbishing and remarketing but possibly making money to help cut the costs of investing in new technology.

However, Schafer says the residual value of these assets "is declining largely because folks are keeping them for a longer time." He says that a "four- or five-year-old server isn't worth very much" and even though there is some inherent value to the metals and perhaps the disk drives and components, the server itself doesn't have much residual value.

Instead of trying to cut corners with asset disposal in order to save money, Schafer says companies should focus on making sure the disposal itself

is performed correctly and cut costs by implementing new, more energy-efficient equipment. "There has been a dramatic improvement in server

energy efficiency over the past few years," Schafer says. "It costs you 70% less to run a server today than it did three or four years ago." **P**

Think About Your Brand & The Environment

If the idea of protecting the environment isn't enough of a motivator to ensure proper server and component disposal, then you should also think about how the public might react if people find out your third-party IT asset disposition (ITAD) provider doesn't follow the proper standards and practices.

"The bottom line is that this entire process is not about the check you might write to do this right, it's about the brand equity and the brand risk," says Rob Schafer, research director at Gartner. "Whatever it costs you to do this right pales in comparison to your brand sitting on [television] saying 'these guys didn't do the right thing' or having your data out on the Internet for sale." Such events can be enormously damaging to your brand and far exceed anything it would cost to fix it, he says.

BONUS TIPS:

Consider Encryption

Rob Schafer, research director at Gartner, says that if you have sensitive data on your servers and hard drives, then you should consider encryption, because if you encrypt those drives, you may not need a "Cadillac point-to-point solution" and could potentially save money on asset disposal. "And if they were to fall off the truck, it would be difficult for a

nefarious third party to extract data and put it on the Internet for sale," he says.

Certification & Destruction

In addition to making sure your third-party vendor is certified for environmental purposes, you also need to make sure it is certified to properly wipe information from hard drives in the first place. Kyle Bittner, business development manager at Ex-IT Technologies (239/596-2254; www.exittechnologies.com), says that the vendor should not only be e-Stewards, National Association for Information Destruction (NAID), or Responsible Recycling (R2) certified, but it should also be able to provide a "certificate of destruction with each serial number confirmed destroyed." A good IT asset disposition (ITAD) provider will also provide a "downstream report, which describes the end-of-life path for the equipment" as well as its components, Bittner says.

Renovate Your Data Center

Account For Cooling, Fire Protection, Disaster Recovery & Other Considerations

ENTERPRISES UNDERTAKE data center renovations for a variety of reasons, including equipment upgrades or a complete overhaul to change the layout or overall size.

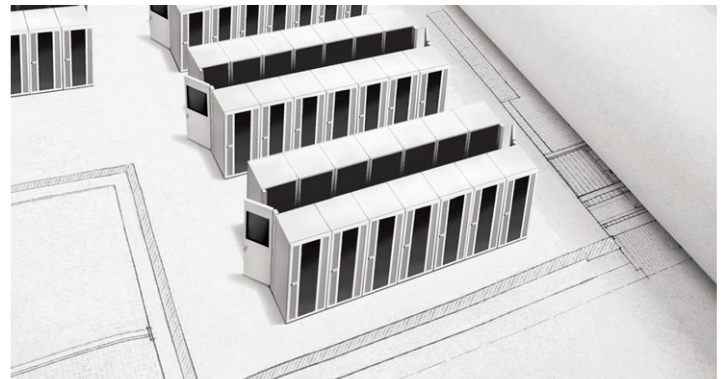
Renovations provide ample opportunity to look at your entire data center and pinpoint systems such as cooling and fire protection that could use an overhaul. It's important not to limit yourself to the usual suspects but instead think outside the box and improve your data center in ways you may not have previously considered.

Alternative Cooling

A renovation provides the perfect opportunity to look at new cooling technologies

and approaches. For instance, David J. Cappuccio, research vice president at Gartner, says some companies may consider whether they can bring in outside air as a cooling mechanism or use outside air as a heat exchange mechanism to reduce cooling costs. But those same data centers may use a renovation as a reason to implement a brand new cooling system.

"With liquid cooling, you have to bring in a cooling distributor on the floor, which is no bigger than a rack," Cappuccio says, so if you're adjusting your room layout, you could make room for a new piece of liquid cooling equipment. Cappuccio says the benefit of implementing liquid cooling is that "when



you're done, 95% of your cooling is done with liquid instead of with forced air," which can result in "45% of your total energy cost" disappearing "because you're not cooling all of that IT equipment" with air.

Cappuccio says liquid cooling is much safer than it may have been 20 or 30 years ago when most data centers had mainframes. Most liquid cooling systems use a low-pressure refrigerant that, in the event of a pipe break, will actually turn into an inert gas when it's exposed to the air, he says.

Just as you can use liquids for precision cooling by running pipes through your racks, you can also use a similar approach for precision fire protection by implementing a dry-pipe system inside of closed racks and then utilizing wet misting systems for the rest of the room, Stahl says. If one rack catches fire, you can put it out with targeted suppression instead of blanketing the entire room. This helps prevent unnecessary downtime due to cleaning up dry chemical residue throughout the facility.

Business Continuity & Disaster Recovery

Data center renovations are usually aimed at improving performance or consolidating equipment, but also consider how to protect your business in case of a disaster. "People are starting to tie business continuity and disaster recovery planning into data center strategies, which sounds like an obvious thing, but historically was never done,"

Cloud & Hosted Considerations

With cloud computing and hosted services becoming such a large part of the business world, data centers are finding that their equipment and infrastructure needs are dwarfed by the sheer size of their facilities. "I've been in a data center recently where it all of a sudden had about a third of the equipment and racks in it and three-fourths of the floor was open," says Darin Stahl, principal consulting analyst at Info-Tech Research Group.

That same data center had to put up temporary walls to help with cooling issues, but it still has those systems and power equipment in place, whether it uses them or not, Stahl says. That's why he says it's so important to look ahead at where your workloads will be in the future, even if they're currently in-house. If you plan on taking advantage of infrastructure- and software-as-a-service hosting, then you should take steps now to consolidate your data center.

Fire Protection Strategies

Consider your fire protection and suppression system during a data center renovation, says Darin Stahl, principal consulting analyst at Info-Tech Research Group. He says that many companies are paying for extensive dry chemical fire protection systems that are built to "flood the room with chemicals" in order to suppress a fire.

Cappuccio says. “It was always a secondary project. You created a data center strategy, built the data center, and then somebody got a side project to start deciding what disaster recovery is about.”

Now, companies are considering whether they need an offsite data center in addition to their current facility.

This is particularly beneficial during renovations, because you could “free up space or get riskier systems out of the room and put them in the secondary space temporarily,” Cappuccio says. But you could also use this secondary, and potentially smaller, facility as “an augmentation strategy” for growth. In essence, a second data center “becomes a workable environment that can be used for both business continuity and migration strategies.” You’ll always have a facility ready to go, so that even during a renovation, your business will run as usual.

Effects Of New Technology

Cappuccio says that when most data centers start a renovation, they perform a “linear analysis” where they determine how many storage solutions, for example, they have and what their percentage growth is each year. Then, they “extrapolate that over the next 10 years to know how much storage they’ll need and how much floor space they need for the racks,” he says.

Instead, he recommends companies keep Moore’s Law in mind during planning and understand that every new generation of technology is often smaller than the last. “If you apply those generation changes and Moore’s Law to growth, you find out that the floor space you think you’re going to need is a lot less than you originally planned.”

Stahl recommends companies create a technology or infrastructure road map that clearly shows what types of technology the data center should be interested in based on its current and future needs.

He uses the example of solid-state storage, which is “on the tip of everybody’s tongue right now.” But if your company doesn’t currently have a business need for SSDs, then you may not

be able to justify the price. Still, you should include solid-state storage in your technology road map, because as the price goes down, it may prove to fit your future business requirements.

The key to getting out ahead of technological innovation is to opt for modularity as much as possible during renovations and retrofits and to also implement solutions with room to grow. **P**

Seek Expert Advice

David J. Cappuccio, research vice president at Gartner, says that one of the mistakes data centers make during new builds and renovations is relying on their own internal expertise rather than seeking outside help. It doesn’t mean that your IT team doesn’t know what it’s doing with the equipment and the data center in general; it’s just that for most of them, it’s the first time they’ve ever done it, he says.

“Go and get some outside expert, an engineering firm or design firm, just to do what’s called a data center assessment,” Cappuccio says. “They’ll come in and tell you what you have now and what you could potentially do with [your data center].” He says that the data center design experts can give you a high-level perspective of your facility’s capabilities.

BONUS TIPS:

Avoid A Narrow Focus

Darin Stahl, principal consulting analyst at Info-Tech Research Group, says many data centers will focus on one thing to renovate and “look at it in isolation.” The problem is that “the knee bone is connected to the shin bone, and they’re all a part of a larger system of delivery and an

ecosystem,” he says. It’s crucial to come up with a list of requirements for your data center as a whole that covers all aspects, because performing one small renovation may not solve all of your problems and could, in fact, cause new ones.

Use What’s Around You

Some enterprises prefer to hold on to as many design elements of the current space

as possible simply because they are familiar. Although this can be fine in some respects, it can also cause an organization to not adopt changes that would prove beneficial in the long term, such as incorporating green data center design aspects or taking advantage of free-air cooling resources that could reduce power-related cooling costs in certain geographical locations.

Improve Application Management

Take Control Of Your Apps By Planning, Monitoring & Changing Your Point Of View

MOST COMPANIES ARE BUILT on applications. They run internal systems for employees, bridge the gap between the business and the customer, and more. But with so many applications running at any given time, it can be difficult to manage them, monitor them, and make sure they are up to date.

It's important to put the right amount of focus on your applications, deploy helpful management solutions, and prepare for what might happen in the future by developing a game plan from the beginning.

Be Proactive & Plan Ahead

Being unprepared for change is a major contributor to losing control of your applications. Altaz Valani, senior consulting

analyst at Info-Tech Research Group, says that companies need to "know the impact of any change to your application, whether it's a greenfield or sunset scenario." You may think you can simply test an application once, deploy it, and update it with patches and other bug fixes as needed. But if you follow a set-it-and-forget-it model, you could end up with major issues.

"When we talk about patch releases, there needs to be a synchronized approach," Valani says. "People need to know when these patches are going to be put in place. Many vendors will provide you with an actual scheduled release date for when patches will come out. Work the timelines around that, run the automation



and scripting, and create that automated run book, so you know that when it comes time to deploy this, you're not going out there and fiddling at the last minute trying to put this manually onto each server."

Develop An Application-Centric Mindset

Will Cappelli, research vice president at Gartner, says most organizations can be broken into two groups: those with an infrastructure-centric point of view and those with an application-centric point of view.

With an infrastructure-first mindset, even if you do monitor your applications, "those applications are just one species of managed object alongside servers, databases, and routers," he says. But when organizations have an application-centric point of view, "the major business applications effectively become the windows through which they look at the infrastructure."

You have to look at applications as the reason to have infrastructure. Regardless of what type of application you need or how resource-intensive it may be, make sure your infrastructure can handle it. For management purposes, an application-centric mindset is absolutely crucial to making the deployment and management simpler and more efficient.

"There is a traditional model where the application is developed, tested, and thrown over the wall into production," Cappelli says. "We're beginning to see this change, and I think it's absolutely essential that it does change. From a process perspective, one really needs to, in some sense, extend the idle process framework up into the application layer, and it needs to extend aspects of CMMI [Capability Maturity Model Integration] down into the infrastructure layer to create a more full-bodied figure and speed everything up tremendously."

Avoid Skipping Application Versions

Some companies may try to save money by skipping versions of applications and avoiding the upgrade process altogether in some cases. The problem with this approach is that not only will you miss out on upgrade support and some of the newer features that could improve performance or even fix exploits, but you could also end up spending quite a bit of extra money in the future in an effort to catch up.

"If you don't stay on the maintenance path for a particular package or middleware, then it often makes the upgrade to future versions much more costly later," says Kurt Bittner, principal analyst at Forrester Research. "Many times organizations are better off from an overall total cost of ownership to maintain it relatively close to the current release cycle for the vendor products because then they get all of the latest bug fixes."

Continuously Deploy & Upgrade Applications

You can improve application management by rolling out new applications or upgrades a little at a time rather than in one big push.

“The idea here is that organizations need to get much better at deploying things faster,” says Kurt Bittner, principal analyst at Forrester Research. “To deploy things faster, you do it in smaller increments more rapidly and establish a feedback loop between operations, development, and the business. Rather than waiting six months, 12 months, or 18 months and deploying a large chunk of functionality with very high risk, it’s much better to deploy that in a bunch of smaller changes.”

Cappelli agrees, adding that companies need to “get used to the idea that the number of changes will increase dramatically and they will continuously flow into the production environment.” Vendors tend to update their applications on a fairly consistent basis, and if you consider how many applications are running in your data center at any given time, those changes can really start to add up.

Consider Application Portfolio Management


If you have difficulty managing applications individually, you might want to consider

application portfolio management (APM). Phil Murphy, vice president and research director at Forrester Research, says companies have been deploying apps steadily since the 1960s and that those apps have been “put in a big bucket. It’s rare to take apps out of the bucket, so you’ve got this accumulation of technology across time of varying capability, and we’ve just accumulated, accumulated, and accumulated.”

Now, about 50 years later, companies struggle to determine exactly how many apps they have running at any given time, what the requirements are for those apps, and how to get a better grasp on what they really need.

“We’ve reached the point in some firms where . . . it costs 90% of the budget just to turn the lights on every day. That’s a pain point that’s driving people toward application portfolio management.”

Murphy says APM gives companies a way to look into their “bucket” of apps to determine what they own and also compare the “health, size, cost, and complexity metrics for all of those apps.” It allows you to benchmark them against one another and “quantify their importance to the business.”

If the main goal of individual application management is to gauge the efficiency of applications, then Murphy says the focus of APM is on overall effectiveness. “Are you even working on the right things? If you’re not, then doing them in the most efficient way doesn’t help you. That’s the big takeaway.” 

Bring Your Testing & Production Teams Together

One of the biggest issues with application development is the disconnect between the people who test the app and those who monitor and manage it throughout production.

“With application development and production being in such different worlds, you have tools that have grown up on each side that are completely isolated from one another,” says Will Cappelli, research vice president at Gartner. “The model that an application tester has is described in a language that is very different than one someone in production may have.” That’s why he says it’s so important for these groups to “share tools so that the same technologies that are monitoring performance in the production environment are used to monitor performance in the test environment.”

BONUS TIPS:

Constantly Monitor Applications

To be prepared for failure and see the tell-tale signs or just to make sure performance is at an optimal level, you should “monitor the application’s heartbeat,” says Altaz Valani, senior

consulting analyst at Info-Tech Research Group. “Don’t ignore some of the smaller application problems that come up and eventually escalate into major issues later on,” he says.

Don’t Get Caught Off Guard

No matter how well prepared you are during the testing and

deployment phases, “don’t think that there’s an application out there that will never fail,” Valani says. Valani says that companies must “be humble and realize that no application is actually infallible.” Instead of hoping an application always works as intended, plan for the worst-case scenario and know what to do if an app fails.

Have A Plan For Tablets In Your Enterprise

Build A Business Case, Then Know How You'll Handle Security, Network Traffic & BYOD

THERE ARE MANY things to consider when procuring tablets for enterprise deployment. Beyond network, data security, application, cost, support, and platform issues to mull, IT must consider if there's even a strong business case to make for tablets in terms of whether employees will benefit from having them.

"Enterprises shouldn't just get tablets to get tablets; they should be adopting them for specific employees who will benefit from them," says Christian Kane, an analyst at Forrester Research.

Have A Strategy & Stick To It

Andrew Borg, research director for mobility and collaboration at Aberdeen Group,

says every enterprise needs a well-established, enforceable mobile-device policy, regardless of whether the business plans to deploy tablets or will allow employees to purchase and bring their own devices to work through a bring your own device (BYOD) policy.

"Having a strong enforcement policy prohibiting BYOD on tablets is one way to keep the Barbarians at the gate, if you will." Without such a policy, he says, "trust me, there will be employee-owned tablets trying to access corporate-owned email right now."

For example, he says, even if employees bringing tablets to work don't intend to use them for work purposes, every tablet entering the



enterprise is "pinging for a Wi-Fi connection without the user requesting that capability. The default is 'connect to available Wi-Fi,'" he says. "I'm not saying they will be successful, but I am saying whether IT wants it or not, there are already devices trying to access the network."

Seek Employee Input

Obtaining employee input is imperative when weighing tablet choices. The best approach, Kane says, is asking employees about their preferences, how they work, and which tools they need to do their jobs.

"The goal is to improve productivity and efficiency and help people get their jobs done," he says. He adds that employees generally want to provide input concerning issues they're experiencing and how to improve them. "Ultimately, one side shouldn't dictate everything; it really should be a decision

that's made with influence from both parties, and understanding the behaviors and the needs of both sides is the best way to do this."

Borg says acquiring end-user input is important. Ultimately, he says, usability and end-user experience define a program's success.

Acquiring end-user input on tablets and smartphones presents different challenges than input on laptops for small IT departments, however. Obtaining input for laptops really isn't necessary because laptops are essentially movable desktop systems that have become highly standardized over time where OS, platform, and core business productivity applications are concerned. Unlike with tablets, "it isn't about personalization, what apps you've loaded, how cool or sexy it is to carry around, or really about battery life," Borg says.

In terms of mobile usage, he says, tablets are "much

Don't Sweat The Specs

"It's not about specs anymore," says Michael Battista, Ph.D., consulting analyst at Info-Tech Research Group. "Any two tablets can have exactly the same specs but widely different user experiences and capabilities."

Instead of getting held up on specs, companies should instead look at operating systems and form factors (or screen size). It's also important to determine if applications are available to accomplish desired tasks, says Christian Kane, analyst at Forrester Research. "If you have an idea of who will use them and what they will use them for, you'll know if there are available applications," he says. "In general, native apps are still developing, but there are plenty of them already out, and Web apps are something that allow you to care less about the platform on the device, which is nice."

more like a smartphone than a laptop.” As a result, usability, app usage, battery life, and end-user experience are more important and play a bigger role in a deployment’s success.

Consider The Security Risks

As with any device, there are security risks specifically associated with tablets, says Michael Battista, Ph.D., consulting analyst at Info-Tech Research Group. “Tablets are small, so they tend to be brought everywhere and often left lying around,” he says. “If the device didn’t have a passcode to unlock it, that could mean super-secret company data gets out there for anybody to take a peek at.”

Battista adds that tablets are also seen as being less manageable than traditional computers because they are based on operating systems that “weren’t designed with businesses in mind.” This leads to many IT departments not having the expertise or experience to tightly control tablets.

As for the security risks, companies simply need to make sure employees are always aware of their tablets and understand that they can be a key for any thief to unlock sensitive company information.

Battista recommends companies make it policy to put passcodes on tablets and

also make it so tablets can be remotely wiped if lost or stolen. He adds that to help improve manageability, companies can invest in mobile device management suites that, “through a combination of back-end infrastructure and on-tablet agents, can bring tablets to a manageability level approaching what companies have gotten used to with Windows-based PCs.”

Can Your Network Handle The Traffic?

Whether your company decides to issue tablets to the workforce or you support a BYOD policy, the increased traffic could have a dramatic effect on your network. In many cases, this rapid increase in traffic could create spotty connections and slower speeds for everyone.

If your wireless network isn’t ready ahead of time, you could incur bottlenecks that not only harm the connection speeds of tablets, but also every other device in your company. You should consider how

many devices will connect to your network at any time and how much of your networking resources they will use. Then plan accordingly to avoid overly taxing your network and possibly incurring downtime. **P**

Assess The Need For Tablets

Before you even start looking at which tablets to purchase, make sure that your workforce will actually use them. Letting employees bring in their own devices is one thing, but choosing to issue tablets or fully support them should be a needs-based decision.

“Most companies should be preparing for an increasingly mobile world regardless, but if they are officially supplying or supporting tablets, make sure there is an actual use case for it,” says Michael Battista, Ph.D., consulting analyst at Info-Tech Research Group. “Tablets are increasingly ready for real work, but only certain kinds of work. Don’t jump on the bandwagon just because it’s what the cool kids are doing, but also don’t resist change if it has a purpose.”

BONUS TIPS:

Start With A Pilot Program

“Tablets won’t be the silver bullet to solving all mobility problems,” says Forrester Research analyst Christian Kane. “They will be right for some employees and wrong for others.” Thus, he advises to begin deployment with pilot programs and understand that the platforms themselves are still very

immature. “Deliver what you can today given the immature technology, security and management requirements, and the status of current hardware/software life cycles, and then expand as you can,” he says.

Consider Mobility Management

Particularly for small, overworked IT departments, a fully integrated enterprise mobility

management solution that oversees management of the tablet and data on it is a good fit, says Andrew Borg, research director for mobility and collaboration at Aberdeen Group. “There’s a whole variety of pricing models and capability sets that really can meet almost any need,” he says. Options include cloud-based, on-premises, and hybrid solutions and evergreen and per-seat licensing arrangements.

BUYING TIPS: Servers

WHEN BUYING A new server, you have to know much more than just your enterprise's current and future needs. Budgets, compatibility, and vendor considerations also come into play.

Above all, you need to understand when it's time to buy new servers. As with any IT purchase, the goal should always be to invest in a solution that will meet performance needs for years to come.

Determine Features You Need

Charles King, president and principal analyst at Pund-IT, says CPUs, memory, and I/O are the most critical server features, though their relative importance depends on the application and workload. Companies running a business-critical database or online transaction program, for example, should eye a higher-end CPU/system than what's needed for general-purpose applications. For virtualization-related use, spend more for extra memory and I/O.

Mark Bowker, Enterprise Strategy Group senior analyst, says that too often, buyers purchase a server with more capacity than needed, which provides the comfort of extra headroom but adds expense. At the same time, though, you want to future-proof your investment as much as possible by looking for efficient, power-saving servers that can help lower energy costs in the short and long term.

"IT should understand what the latest processor chipset is on the market and what the stated road map of the chip manufacturers are," Bowker says. "This will help avoid buying into servers that are at the end of a product life cycle."

Tau Leng, Ph.D., vice president and general manager of corporate marketing and HPC solutions at Supermicro (408/503-8000; www.supermicro.com), says today's server systems are available with a variety of processor technologies and form factors. "Customers often purchase equipment that is overdesigned with unnecessary features," he says, which is why it's essential you work with an experienced and reliable partner that can offer a variety of solutions.

In addition, Leng says, adherence to standard rack unit is important to allow for easy interchange of servers. Remote management features also are critical, and power savings is becoming an important element in TCO determinations.

Consider Your Budget & The Total Cost Of Ownership

Before you get started with a server upgrade or replacement, be sure to carefully plan your budget. Don't forget that the total cost of ownership includes many different items beyond just the upfront server cost.

Possible expenditures include equipment, software licensing,

labor, telco and power company services, facility improvements, vendor support, and downtime. Additional costs related to supporting a new platform can include those for power, network cabling, cooling, rack space, and management personnel, he says.


"In any infrastructure purchase, the upfront capital acquisition cost is just part of the deal. Three- to five-year total costs should be calculated, including maintenance and facilities costs," says John Sloan, principal consulting analyst at Info-Tech Research Group.

Watch For Trends

Leng says one relatively new trend in servers is high-temperature free-air-cooled server environments, which can reduce electricity demand and rein in costs.

Virtualization and consolidation are also having an impact. Sloan says it's important to know how a server will fit into a consolidated stack that includes servers, networks, and storage.

Unlike distributed models, Sloan says, "in a consolidated infrastructure, the server is a unit of hard capacity (processing and memory) that's combined with networks and storage in a resource pool that's partitioned up into virtual entities." Increasingly, he says, enterprises aren't buying servers, but blocks of capacity.

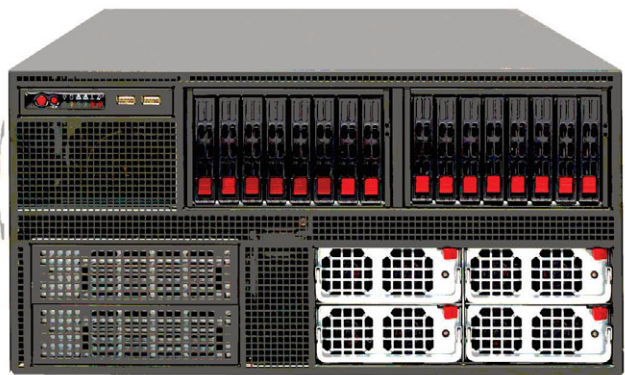
What differentiates current offerings "is how the interconnects are managed and how the whole thing is managed as one resource pool," Sloan says. Typically, blade servers are the form factor for consolidated offerings, he says. 

CHECKLIST

Match needs, requirements. Make sure the application and workload the server will support aligns with the CPU, memory, I/O, storage, and other components you plan to purchase.

Spot upcoming trends and know how you'll use them. Virtualization, consolidation, and cloud computing are trending areas where servers are concerned. How will these trends impact your data center and the servers you purchase, both now and in the future?

Check your vendor. Ensure the vendor you plan to buy from satisfies all questions concerning support, compatibility, performance, and other issues.



BUYING TIPS:

Environmental Monitoring Equipment



DO YOUR HOMEWORK, know your goals and vulnerabilities, and learn from experience. Then throw in a good amount of common sense. That simple advice can go a long way toward finding the best environmental monitoring product for your enterprise.

“Experience is the key to knowing what a particular facility will need and which features will prove to best meet a user’s monitoring needs,” says Michael Sigourney, president and CEO of AVTECH Software (888/220-6700; www.avtech.com).

Establish Your Priorities

Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com), says environmental monitoring needs to be a priority. “Even though the popularity of this type of monitoring has been growing rapidly for several years now, it is still very common for companies to put off the spending until after they have a problem.”

Start by identifying your goals and vulnerabilities. “Is the priority to only look at the efficiency of the environment to make cost-saving improvements? Or is there a concern to make sure that all systems are operating and receive immediate notification when systems may be threatened? Threats can range from temperature, humidity, power, water leaks, smoke, fire,

security, and more. A common-sense evaluation should point to the best solution.”

Sigourney says one common mistake is buying too little or too much of a solution. “We recommend users buy what they believe will best meet their needs and budget using a ‘best-fit’ strategy.” Talk with manufacturers and their product specialists, he says. Their input can save you significant time and money.

Know Your Options

When it comes to available environmental monitoring options, Sigourney says there is a common path for most facilities.

“Typically a user starts with temperature (lots of it), a humidity sensor (for the room), power sensors (monitoring on/off access at key sources or for each phase), flood/water (under a raised floor or between racks and water threats),” he says. Beyond that, data centers may also need sensors for smoke/fire, airflow, room entry, motion, outdoor temperature, sound, light, and other conditions, he says.

Make sure the solution you pick matches your individual level of expertise and understand that the most popular monitors have different user interfaces, Sigourney says.

Check For Alerts

Once you’ve figured out which sensors you need, decide

how you want the system to communicate conditions and threats, Douglass says.

SNMP support is usually a requirement so you can make use of existing in-house software. Although email and text message alarms are convenient, they aren’t reliable in case of a catastrophic failure, he says. “Some sort of out-of-band notification, like a phone call, provides an increased level of protection and reliability.”


Sigourney says any device you consider should connect to the network via Ethernet and allow email or email-to-SMS.

Plan For The Future

Make sure the environmental monitoring solution you

purchase can be expanded over time, without limits on the number of monitors, alerts, and users, Sigourney says.

Be sure to check the vendor’s commitment to releasing new and enhanced versions of its monitoring software. “That’s important. If the vendor regularly adds value and new features, users win,” he says. “If the vendor does not keep their software up to date, you may one day find that the monitors you purchased and depend on have become expensive paper weights.”

But don’t forget that you’re responsible for downloading firmware and software updates, he says. “Don’t blame the vendor if your team is complacent and fails to do their part.” 

CHECKLIST

Don’t delay. “The most common mistake is complacency, believing that because a facility has not had a problem in the recent past, it will not have a problem in the future. This causes people to delay a purchase or installation,” says Michael Sigourney, president and CEO of AVTECH Software (888/220-6700; www.avtech.com).

Embrace redundancy. Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com), says a monitoring system won’t be of much help unless it is more reliable than your other systems. “Avoid dependencies and embrace redundancy. Ultimately, you want to know if you have a problem. And if you have a big problem, you want to make absolutely sure that you know about it immediately.”

BUYING TIPS:

Data Center Cooling



NO MATTER WHAT the temperature is outside, most data centers need at least some degree of cooling year round. Having cooling equipment that can keep up with demands is essential. Here are things to keep in mind.

Plan, Plan, Plan

Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com), says you need a strategy. “Establish a cooling methodology for your data center. Raised floor or no raised floor? Hot aisle/cold aisle? Containment? Perimeter cooling or localized cooling? A combination of methods?”

Along with that, understand the total investment and what you need for the cooling equipment. “For example, liquid cooling using chilled water is extremely efficient, but if you do not have access to a chiller or a budget to purchase one, this is not a good option.”

Know Your Options

Are you building a new data center from the floor up or upgrading a current system? Are you looking for a permanent system or a portable air conditioner for short-term needs? These are all important questions to answer.

In addition to these options, Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says

you need to determine whether you’ll be using computer room air conditioners (CRACs), which have self-contained compressors and require condenser water, or large central chillers that require computer room air handler (CRAH) units. “The different types of units have different needs and require different types of maintenance,” he says.

Size The System

To understand how much cooling capacity you require, calculate the load that needs cooling and total tons of cooling, accounting for future growth, Koty says.

Will Beene, rack specialist and technical account manager at RackSolutions (888/903-7225; www.racksolutions.com), agrees. “It’s critical to calculate the amount of cooling that a rack or cabinet system will require prior to the equipment being put into production, though this is not always easy to determine,” he says. “If available, look at the production loads going back six months to determine what the equipment is doing during a 24-hour cycle.”

Koty says it’s equally important to know the sensible and latent capacity the equipment will produce; manufacturers should provide documentation for these capacities.


Don’t be surprised if you already have adequate cooling capacity for the equipment on the

floor, Koty says. “A lot of data centers are designed with excess cooling capacity. Unfortunately, the excess capacity masks other cooling efficiency issues like air-flow bypass, recirculation, and air stratification,” he says. “As long as these other cooling inefficiencies exist, excessive energy consumption will continue.”

Dickson says the cooling equipment needs to be able to scale. “Think about not only what is in the room now, but what you plan to add or think you might add over the next three to five years . . . You don’t want to have to do a total rebuild or buy a new CRAC/H unit,” she says.

Other Factors To Consider

Don’t overlook details when comparing air-conditioning systems. Koty says to look for controls that can be monitored remotely and the ability to lock the control panel to prevent unauthorized personnel from changing temperature and humidity settings.

Koty says other important features include internal smoke detectors and liquid detectors that can be monitored remotely. Also consider maintenance. You should have easy access to perform tasks such as changing filters, cleaning coils, and replacing compressors and belts. 

CHECKLIST

Calculate your load. A good place to start is by calculating how many BTUs you need to keep your equipment at the appropriate temperature. Be sure to account for heat load and future growth.

Know how many units you need. You shouldn’t only buy enough units to handle your current load. Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says you need to account for future growth and the failure of a unit or the need to shut down a system for proper maintenance. The total CFM output of your units can also impact how many units you need, he says.

Consider other cooling alternatives. In addition to HVAC units, portable air conditioners, and other similar cooling options, consider using server and desktop CPU coolers. According to Dynatron (510/498-8888; www.dynatron-corp.com), such products can help keep the CPU temperature under control. Coolers typically use energy-saving fans to reduce the power of the overall system and the data center’s cost.

BUYING TIPS:

Data Center Cleaning Services



A CLEAN DATA CENTER is crucial to the performance of your physical infrastructure and the productivity of your workforce, but you can't rely solely on your janitorial staff to get the job done. For certain tasks, you'll want to hire a professional who can get the job done quickly and with little inconvenience.

Because there's a lot riding on your data center, hiring the best cleaning company—with the right qualifications and experience—is essential. Here's what to look for when hiring a data center cleaning service.

Check A Service Provider's Experience & Reputation

It's important that you don't rush in to choosing a data center cleaning service, because there are multiple factors to consider that may make one firm fit your needs better than another. Not every data center is created equal, and many data centers have unique cleaning needs that not all cleaning services can address.

You should research what cleaning firms offer and also look at their reputation and guarantees. You must make sure the provider has years of training in cleaning data center environments, including floors, ceilings, cases, internal components, and

much more. In addition, cleaning companies should follow ISO 14644 standards, have experience cleaning ISO class 8 environments, and know how to address airborne contamination and particulate migration.

To help narrow your list of choices and assist you in making an informed decision, also find out exactly what services a cleaning firm offers and what kind of quality you can expect. The cleaning service should also be able to provide a detailed list of what it cleans and how thorough it will be.

Understand Your Costs

Cost for cleaning varies depending on what a provider offers as well as its reputation. But don't let price fool you. A lot of factors go into the overall price of a cleaning service, and you should make sure you get exactly what you're paying for.

Be sure to look at what is being cleaned for the price you pay and the level of cleaning being performed. There may be specific situations, such as after construction or in the wake of a disaster, where you will need more in-depth cleaning services than on an annual floor cleaning. One type of cleaning may take more time than another, which could affect

the overall pricing of the service, as well.

Know What To Clean

Some parts of your data center will need to be cleaned annually, while others will require quarterly or biannual cleanings. But it's a fairly safe bet that, at some point, everything in your data center will need to be cleaned. Create a cleaning schedule for the building itself as well as the equipment and stick to the plan.

Make sure your cleaning schedule covers all access floors and floor panels, walls, ceilings, light fixtures, server

racks, UPS units, panels, and more. The best cleaning firms have practices in place that will leave no stone unturned.

Set Clean Policies So Your Data Center Stays Clean

Between cleanings, institute policies that limit the access employees have to certain areas of the data center as well as what they can bring into the room itself. If you can get your employees to treat the data center as a sterile environment and decrease the amount of foreign contaminants, it will make the cleaning crew's job easier and potentially lower your costs. **P**

CHECKLIST

Look for certifications. Check to see if your provider is a member of the Association of Data Center Cleaning Professionals. Also, know what standards, if any, it follows for cleaning.

Understand who will do the cleaning. Require that the cleaning service's employees be background-checked and drug-screened.

Know what will be cleaned. Get a detailed scope of work. What will the company clean, and how thorough will it be? What kind of quality can you expect? Consider creating a cleaning schedule.

Follow up. Periodically check the work in progress.

Make sure the data center stays clean. Decrease the likelihood of foreign contaminants by limiting what types of liquids and/or chemicals are allowed in the data center.

Network With Your Peers At These IT Training & Association Meetings Across The United States

MARCH

Interconnecting Cisco Network Devices 1

March 7
New Horizons Washington, D.C.
1331 F St. N.W., Suite 420
Washington, D.C.
www.dcnewhorizons.com

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AITP Wheeling

March 12
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

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AFCOM North Carolina

March 13
Marriott at Research Triangle Park
4700 Guardian Drive
Durham, N.C.
www.afcomnc.org

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AITP Research Triangle Park

March 13
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

AITP Washington D.C.

March 13
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

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Implementing Cisco Intrusion Prevention System

March 17
New Horizons Tysons Corner
2010 Corporate Ridge, Suite 200
McLean, Va.
www.dcnewhorizons.com

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AITP Lehigh Valley - The State Of IT

March 20
Lehigh Carbon Community College
Community Services Center Ballroom
Schnecksville, Pa.
www.lv-aitp.org/events.php

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AITP Long Island - Careers SIG

March 20, 5 p.m.
Carlyle at the Palace
1600 Round Swamp Road
Plainview, N.Y.
www.aitp-li.org/?q=node/29

AITP Twin City

March 20, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

• • • • •

AITP Akron

March 25, 6 to 8:30 p.m.
Akron, Ohio
www.akron-aitp.org

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Interop Las Vegas

March 30-April 4
Las Vegas, Nev.
www.interop.com/lasvegas

• • • • •

Big Data TechCon

March 31-April 2
Cambridge, Mass.
www.bigdatatechcon.com

APRIL

**2014 High Performance
Computing
Linux for Wall Street**

April 7
Roosevelt Hotel
New York, N.Y.
www.flagmgmt.com/linux

AITP Wheeling

April 9
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

AITP Research Triangle Park

April 10
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

AITP Washington D.C.

April 10
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

Women In Cybersecurity

April 11-12
Nashville Airport Marriott
600 Marriott Drive
Nashville, Tenn.
www.wicys.net

**Configuring,
Managing &
Troubleshooting
Exchange Server 2010**

April 14
New Horizons Washington, D.C.
1331 F St. N.W., Suite 420
Washington, D.C.
www.dcnewhorizons.com

**AITP Lehigh Valley -
Annual Tour**

April 16
www.lv-aitp.org/events.php

AITP Twin City

April 17, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

**AITP Long Island -
Healthcare SIG**

April 22, 8 a.m.
www.aitp-li.org/?q=node/30

SharePoint TechCon

April 22-25
San Francisco, Calif.
www.sptechcon.com

**Data Center World—
Global Conference**

April 28-May 2
The Mirage; Las Vegas, Nev.
www.datacenterworld.com/spring

AITP Akron

April 29
Akron, Ohio
www.akron-aitp.org

MAY

AITP Research Triangle Park

May 8
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

**Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.**

PROCESSOR[®]

Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

**To list your company and products,
call (800) 247-4880.**

PHYSICAL INFRASTRUCTURE



RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

- Computer Server Racks
- Cabinets and Shelves
- Mounting Products

(888) 903-7225 | www.racksolutions.com

PHYSICAL INFRASTRUCTURE



Customers look to Panduit as a trusted advisor who works with them to address their most critical business challenges within their Data Center, Enterprise, and Industrial environments. Panduit's proven reputation for quality and technology leadership coupled with a robust ecosystem of partners across the world enables Panduit to deliver comprehensive solutions that unify the physical infrastructure.

Products Sold:

- Abrasion Protection & Heat Shrink
- Cable Ties & Accessories
- Cabinets, Racks & Cable Mgmt
- Copper & Fiber Systems
- Identification
- Intelligent Systems
- Outlets & Faceplates
- Power & Environmental Monitoring
- Routing & Pathways
- Safety & Security
- Supports and Fasteners
- Terminals, Power Connectors & Grounding
- Tools
- Wiring Duct

(800) 777-3300 | www.panduit.com

PHYSICAL INFRASTRUCTURE



Total Cable Solutions (TCS) provides a wide range of products from copper keystone jacks to custom bundled fiber cables. All products are manufactured with TCS' highest quality, in factories that are ISO-9001 and TUV Certified. All of our cable lines meet or exceed EIA/TIA RoHS standards.

Products Sold:

- Fiber patch cords
- Pre-terminated multi-fiber trunk cables
- CAT5e and CAT6 patch cables
- Fiber and copper patch panels

(888) 235-2097 | www.TotalCableSolutions.com

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For more than 30 years, the industry has trusted Alber with their mission critical batteries. Power interruption in any business means lost revenue. Are you willing to risk not knowing if the batteries will perform when needed? With Alber you'll eliminate these unnecessary risks, while benefiting from reduced maintenance costs, and increased safety. Alber's battery management solutions give you the confidence of knowing you're not leaving business continuity to chance.

Products Sold:

Cellcorder CRT-400, Universal Xplorer Industrial Monitor (UXIM), Universal Xplorer Telecom Monitor (UXTM), BDSU-50 (Datacenter Monitor), DC Load Banks, Battery Capacity Test System (BCT-2000), BDS-40, BDS256-XL, MPM-100

(800) 851-4632 | www.alber.com

PHYSICAL INFRASTRUCTURE



Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Pa.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 | www.sensaphone.com

PHYSICAL INFRASTRUCTURE



BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 | www.baytech.net

PHYSICAL INFRASTRUCTURE



LINDY USA specializes in cables, adapters, electronics, and accessories for computer, networking, and audio video applications. Since 1932, Lindy has supplied high-quality interconnects to customers in commercial, telecom, and residential markets. What sets us apart is our complete dedication to innovation, performance, and reliability. Our cabling products are truly outstanding.

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- Power
- Cables
- Adapters
- Much more!

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PHYSICAL INFRASTRUCTURE



As an integrator and master distributor providing quality power solutions, HM Cragg has built a reputation as the company that delivers innovation to aid and satisfy its customers. HM Cragg was founded in 1968 and is 100% employee-owned, focusing on quality people and exceptional products.

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- Control and monitoring (environmental and power)
- Connectors and cables (cord sets, ePDU cables)
- Cooling and Racks (airflow management, portable cooling)

(800) 672-7244 | www.hmcragg.com

PHYSICAL INFRASTRUCTURE



Upsite Technologies®, Inc. is the industry leader in data center airflow management and provides a full suite of products and services designed to optimize data center cooling systems, allowing managers to maximize cooling capacity while reducing energy costs. Upsite distributes its award-winning line of services and products, including its KoldLok® raised-floor grommet, through leading channel partners in the data center industry throughout the United States, EMEA and the Asia Pacific region.

Products Sold:

- HotLok
- KoldLok
- AisleLok
- EnergyLok

(505) 798-0200 or (888) 982-7800 | www.upsite.com

PHYSICAL INFRASTRUCTURE



Founded in 1995, Austin Hughes Electronics Ltd. is a design and manufacturing group that offers a broad range of solutions based around 19-inch rack-mount technology. With a wealth of experience, Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handles
- InfraPower Cabinet Intelligent PDUs
- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 | www.Austin-Hughes.com

PHYSICAL INFRASTRUCTURE



Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.,-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Strip doors
- Enclosures
- Curtains

(877) 746-7540 | www.simplexisolationssystem.com

PHYSICAL INFRASTRUCTURE



Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

Products Sold:

- Racks
- Enclosures/cabinets
- Motorized workstations
- Flat-panel arms
- Computer desks
- Cable management
- Power management

(888) 222-7270 | www.hergo.com

PHYSICAL INFRASTRUCTURE



PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 | www.pducables.com

PHYSICAL INFRASTRUCTURE



AVTECH, founded in 1988, manufactures hardware and software for users at all skill levels to easily monitor environmental conditions in IT and other facilities. Their products will monitor, alert, log, graph, view, respond, report, and protect. Over 130,000 customers across 178 countries makes AVTECH a proven market leader, allowing 'Disaster Prevention' instead of 'Disaster Recovery'.

Products Sold:

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(888) 220-6700 | www.AVTECH.com

MESSAGING & TELEPHONY



3CX was founded in 2005 by entrepreneur Nick Galea who saw the need for an open standard software PBX for Microsoft Windows. With 86.7% of businesses using Windows as their operating system, the need for a software-based phone system which runs on Microsoft Windows was evident. 3CX maintains a global presence with offices around the world, including the United States, the UK, Germany, France, Japan, and Cyprus, as well as fully localized websites available in more than eight languages. 3CX has been selected by leading companies and organizations worldwide to meet their unified communications and telephony requirements, including Boeing, Pepsi, Harley Davidson, Hugo Boss, American Express, and Toshiba.

Products Sold:

- Full range of VoIP telephony software products

(404) 465-3660 | www.3CX.com

SERVERS



Chenbro is a leader in enclosure solutions, selling its products primarily to system integrators and OEM and channel partners. The company's extensive research and development efforts help it to keep its competitive edge and maintain market leadership, with special focus on thermal, EMI, and acoustic solutions. Taiwan-based Chenbro has offices in the United States, UK, The Netherlands, and China.

Products Sold:

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- Blade servers
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CLIENTS



Dynatron excels in manufacturing CPU coolers as well as AC and DC fans from 25mm to 200mm. They also provide for OEM customers any custom-design thermal solution products. Their branded thermal solutions are widely recognized and integrated into desktop PCs, servers, workstations, notebooks, gaming machines, and storage systems. In 2001, Dynatron won its reputation as the first company to integrate the state of the art MicroFin Technology into a PC heat sink.

Products Sold:

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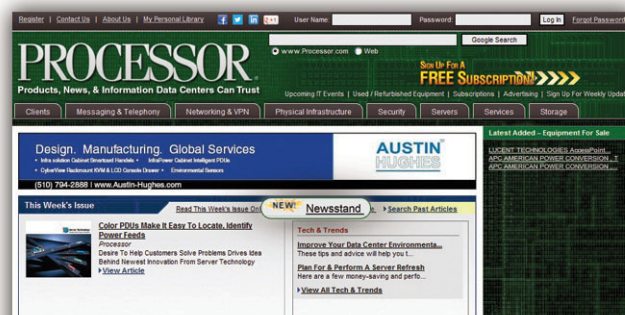
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